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Because of these changes, the manuscript is a bit confusing to use. However, it provides careful and detailed account of the flora of a phytogeographically interesting region where plant distributions are not well documented in the contemporary literature. It has been inaccessible for far too long, and we are glad to finally make it available to the research community.

Alan Whittemore
St. Louis, March 1995

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A MANUAL OF THE FLORA OF NORTHERN IDAHO

Carl Epling

Associate Professor of Botany

University of California

at Los Angeles

and

Joseph Ewan

Instructor in Biology

Curator of Botany

University of Colorado

1941

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by

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University of California
Department of Botany
Los Angeles, California

OCT 21

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(There is a synopsis to this mss. filed in the pending file that should be read.)

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FOREWORD

The study, of which this paper is the record, was begun in the summer of 1923 when I was in the employ of the office of Blister Rust Control, Bureau of Plant Industry. Because of the need for a manual on the part of the several government agencies then operating in northern Idaho, I was encouraged by officials of that office, notably Samual B. Detwiler and Stephan Wyckoff, who, with officials of the Forest Service, offered all available facilities for its pursuit. The descriptions of a majority of the species were prepared in the field and later amplified in the herbarium or, if prepared from herbarium material, notably while in residence at Kew, and at the Missouri Botanical Garden, were later checked in the field. Exceptions are the grasses, sedges, and willows, where the descriptions rest in the main upon herbarium specimens. The work was continued for several summers until 1927, and in 1929, the manuscript, in essentially its present form was carried into the field for several weeks and both descriptions and keys were checked insofar as possible. During 1927-28, opportunity was presented for study in the larger American and European herbaria, where many types were consulted. Here the matter rested, for, because of the economic stringencies of the period, no prospect of publication presented itself and the manuscript was put on the shelf and all but forgotten.

In recent years, increased governmental activity in the area has resulted in an increased need for a flora. Being long out of touch

with the subject and being engaged in other work, I then suggested to Mr. Ewan that he undertake to revise the manuscript in view of much monographic work which has appeared since. This he has done, rewriting and editing much of it and preparing the text for the ferns and the introductory paragraphs, save the general description of the vegetation. It is clear, therefore, that whatever merit may be assigned the paper is due to his careful revision; the shortcomings, I fear, are my own.

Apart from acknowledgments which are made elsewhere, I wish to express my indebtedness to the late Howard Flint, to Mr. J. H. Christ, to Mr. R. R. Humphrey, and to Mr. Wm. Rockie, all of whom have very kindly read the description of the vegetation and have offered valuable suggestions concerning it. I am especially indebted to the latter, who first led me to see trees, as well as the forest; he was one of my most valued teachers. I wish also to express my appreciation to Mr. Gerhardt Kempf, who, particularly upon one long tramp through the St. Joe and Clearwater Forests, aided me greatly by his knowledge of the forest.

For identification of specimens in critical groups, the authors are under lasting obligations to many specialists. Dr. W. R. Maxon has assisted with the Pteridophyta, except Isoetes, for which we are indebted to Dr. Norma L. Pfeiffer and to Dr. E. B. Copeland. Both Mr. K. K. Mackenzie and Mr. J. W. Stacey have generously read the typescript of Carex, the late Mr. Mackenzie determining the collections. Mr. Jason R. Swallen contributed in its entirety the ex-

cellent text for Gramineae. The late Marcus E. Jones looked over Allium and Astragalus, and Charles Piper Smith determined Lupinus. It was not possible to adopt all of his opinions, however. Dr. Philip A. Munz generously determined the genera Epilobium and Oenothera. Many of the Umbelliferae were determined by Dr. Mildred Mathias. Mrs. Eileen Erlanson generously studied Rosa. Dr. S. F. Blake named many Compositae, Dr. Eva Fling Roush, Sidalcea, and Dr. C. R. Ball, Salix. Furthermore, Dr. Ball assisted in preparation of manuscript for Salix, Mr. Alan A. Beetle looked over critically the collections of Eleocharis, and Elmer I. Applegate those of Erythronium and both made suggested comments for the keys. Dr. Rimo Bacigalupi read the text for Saxifragaceae, making valuable suggestions, Dr. R. I Woodson determined Apocynum and Dr. I. M. Johnston, most of the Boraginaceae. The work of Dr. F. W. Pennell upon the Scrophulariaceae, is especially appreciated both in determinations and valuable suggestions and additions to the keys and text. The authors are grateful to all of these.

The junior author is indebted to his wife, Nesta Dunn Ewan, for perennial assistance and encouragement, and to the University of Colorado for support of the revision.

Carl Epling

University of California,

Los Angeles

GENERAL DESCRIPTION OF THE REGION AND ITS VEGETATION

Topography and Climate

The flora of northern Idaho, as delimited in this paper, treats of the vegetation of that part of the state north of, and including the drainage of the North Fork of the Clearwater River, as well as the small part of the Uniontown Plateau immediately north of the main stream in the vicinity of Moscow and Genesee; the area is about equal to that of Vermont. The Clearwater River, which is a tributary of the Snake River, has its origin by three principle branches in the Bitter Root and Clearwater Mountains* and flows from east to west at a distance approximately 140 miles south of the Canadian Boundary. The North Fork mentioned above, joins the main stream near the town of Orofino. The greater part of the region thus delimited is mountainous and is characterized by a forest flora of which the western white pine, Pinus monticola, is an important and characteristic constituent. Inasmuch as the natural floristic and physiographic limits of the white pine forest are not clearly defined, political boundaries have been preferred for practical reasons, although floristic elements distinct and very different from those of the white pine forest have necessarily been included.

The eastern and southern boundaries which have been chosen coincide in general with the limits of the white pine type. This type reaches its greatest development south of the Clark Fork of the

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* Nomenclature after I. Bowman

Columbia in the great Coeur d'Alene, St. Joe, and Clearwater Forests and adjacent lowlands, diminishing quickly and vanishing as one passes the divide into Montana or into the Bitter Root Forest on the south. On the north and west, the boundaries are purely political and arbitrary and it is in the lowlands and valleys of this region that the greatest differences in vegetation can be perceived. We are less concerned with the canyon of the Clearwater River below Orofino, inasmuch as the vegetation there passes quickly into the more xeric flora which characterizes the Snake River canyon. In the extreme southwest corner lies a portion of the Uniontown Plateau, a part of the rolling grassland of the wheat-growing Palouse region of southeastern Washington. Along the valleys, this lowland flora penetrates irregularly eastward well into the forest proper.

The region thus outlined lies wholly within the drainage of the Columbia River and is formed of the western spurs of the northern Rocky Mountain system, with a small portion of the Columbia plateau in the extreme southwest. The principal rivers are the Kootenai, Clark Fork, Spokane, and Clearwater rivers. Lesser but important streams are the Priest River, emptying into the Clark Fork, the Coeur d'Alene, St. Joe and St. Maries rivers, emptying ultimately into Lake Coeur d'Alene, from which flows the Spokane River, and the North Fork of the Clearwater. In addition, there are numerous smaller streams from which these derive their flow.

Five mountain ranges are usually recognized within the area: the Priest River, the Purcell, the Cabinet, the Coeur d'Alene, and the

Clearwater mountains. The first of these, the Priest River Mountains, lie in the extreme northwest, west of the Kootenai River and north of the Clark Fork, rising to maximum elevations of 7000 to 7400 feet. They are drained by the Priest River, which flows southward from a point in British Columbia a few miles north of the Canadian Boundary. Most of the bed of this stream within the United States lies below 3000 feet. Due to stoppage by glacial detritus, it widens perceptibly at an elevation of about 2600 feet, forming Priest Lake and Upper Priest Lake, connected by a short but very beautiful channel, the "Thorofare". At the boundary and a short distance above it are situated two small picturesque falls where the river has carved its way through a narrow canyon. This range has been deeply sculptured by glaciers and streams and the canyons are narrow, with steep sides. Cliff-bordered cirques, talus slopes, and sharp rugged ridges are frequent, especially on the east side. The rocks of these mountains consist principally of Paleozoic metamorphic sedimentary rocks with considerable intrusions of fissured granite and syenite. The soils resultant from the disintegration of these rocks and the consequent retention of surface water may explain in part their luxuriant vegetation and the occurence there of not a few species more characteristic of the Cascade Mountains.

In the extreme northeastern corner, north and east of the Kootenai Valley, lies a small part of the Purcell Range of northwestern Montana and British Columbia. This range is closely allied geologically to the Cabinet and Coeur d'Alene ranges which lie successively

southward. A small part of the Cabinet Range extends into Idaho, lying between the Clark Fork and Kootenai rivers and bounded on the west by the Purcell trench. This western part, lying within our region, is characterized for the most part by rounded peaks similar in height to those of the Priest River Mountains.

By far the largest mountain mass lying within our region and most characteristic of it is the Coeur d'Alene Range, with elevations in general ranging from 6000 to 7000 feet, or infrequently to 7500 feet. As usually defined, this range extends from the Clark Fork and Lake Pend Oreille southward to the divide which separates the St. Joe and North Fork of the Clearwater rivers. Although the northern boundary of the range is clearly defined, the southern one is scarcely perceptible. In passing from the Coeur d'Alene to the Clearwater Mountains, one is hardly aware of any topographic change. As a whole, these mountains are not greatly diversified, the ridges and peaks being nearly equal in height, usually rounded and well-wooded to the summits, with only an occasional peak of irregular outline and associated talus slopes. Viewed from a height, the entire region suggests a much dissected plateau.

The rocks of the greater part of these mountains are Proterozoic sediments. In the region of Lake Coeur d'Alene, and the Spokane, Coeur d'Alene and St. Maries rivers, occur extrusions of Miocene basalts which support a characteristic and local flora. Although geologically different, since they are largely granitic in nature, the Clearwater Mountains, at least within our region, are

topographically similar to the Coeur d'Alenes and support essentially the same flora; indeed, they form with that range a floristic unit which extends in some degree as far south as the Locksa River.

The lowlands within our region fall into two principal categories. In the north, the valleys of the Clark Fork, Kootenai River and the Lakes Coeur d"Alene and Pend Oreille lie within the Purcell Trench; a comparatively broad structural valley, once strongly glaciated and now filled with silts and gravels of glacial origin. Both Lakes Pend Oreille and Coeur d'Alene are drowned valleys believed to have been formed by the damming action of a glacier retreating northward through the Purcell Trench. In addition to these larger lakes, numerous smaller ones are scattered throughout the region.

In the southwest, south of Lake Coeur d'Alene and stretching in an irregular bowed line to the Clearwater canyon above Orofino, is a portion of the Palouse region of southeastern Washington, known as the Uniontown Plateau. This is underlain by thick sheets of Columbia River basalt, through which the Clearwater has carved its canyon, now covered with fine-grained soils deposited by wind and water. The region is rolling with rounded, even hills. Along the eastern border, outlying spurs of the Clearwater and Coeur d'Alene mountains rise to low elevations. Such spurs are uniformly forested. The lowlands are grass-covered. Occasional outcrops occur which modify the local flora.

Climatically, our region is intermediate between the Pacific Coast climate of western Washington and the Rocky Mountain climate, lying in that rainfall regime which has been designated as the

Sub-Pacific. This regime is characterized by a fairly even distribution of precipitation (including snow) throughout the autumn, winter, and spring months and by fairly dry summers. The maximum precipitation falls during the winter months. Above 2500 feet, which may be taken as the mean elevation of the lowlands, the yearly average precipitation varies from twenty to forty inches or more, increasing more or less directly with the elevation. Below 2500 feet, the average falls below twenty inches, especially in the extreme southwest corner and in the canyon of the Clearwater River. The heaviest precipitation (above forty inches) occurs within the mountains, a triangular region whose apex is approximately at Burke, and whose base lies on a line drawn from the Oxford Ranger Station to Fish Lake in the Clearwater Forest.

The variation in amount of rainfall from year to year is noteworthy. For a thirty year period at Port Hill the total precipitation for the driest year was 15.32 inches, for the wettest 38.63 inches; at Murray for a 15 year period, 26.73 for the driest, 45.31 for the wettest; at Moscow for a thirty year period, 10.98 inches for the driest, 30.17, for the wettest. The number of days with .01 inch or more of rain varies in the lowlands from eighty-five to ninety days, with 140 days or more in the mountains.

A climatic factor which has an indirect but profound effect upon the vegetation is the occurrence during the dry season of electrical storms accompanied by little or no precipitation. These are an important cause of forest fires inasmuch as they commonly occur

during a period of low relative humidity and consequent high inflammability of the timber and duff.

The data for snowfall are even more meager than for rainfall. On the lowlands of the Palouse region at Moscow there is a mean annual snowfall of approximately fifty inches. At the station of Murray within the mountains at 3000 feet, an average depth of twelve feet or more has been recorded. At Burke, 4082 feet in elevation, the average recorded for a period of nine years is over seventeen feet (207 inches). On the high ridges and slopes no data are available, but judging from the position of traps, blazes, and other indirect evidence, the average probably exceeds seventeen feet. At Port Hill in the Kootenai Valley near the Canadian Boundary, with an elevation of 1615 feet, the average depth recorded is seventy-six inches or more. At all of these stations the greater part of the snowfall is recorded from November until March. In the mountains at high elevations, snow during the summer months is infrequent and ephemeral. Generally speaking, at lower elevations the first killing frost occurs from the first week in September to the first week in October; the last, during May. Few or no data are available for higher elevations.

The range of temperatures approaches the continental type. The minima recorded occur from January to March and vary during this period according to position from north to south and to a less degree with elevation. At Moscow the absolute minima recorded vary from -1° to -27° F.; at Port Hill, from -8° to -28° F.; at Murray, from -6° to -22° F. Lower minima doubtless occur at higher elevations. The abso-

lute maxima recorded at Moscow vary from 98° to 100° F.; at Port Hill from 91° to 100° F.; at Murray, from 97° to 99° F. Within the Clearwater canyon much higher maxima occur. For the region as a whole, the mean temperature for July varies from 80° to 85°; for January the mean minima vary from 14° to 20° F.

LOWLAND VEGETATION

In the lowland, particularly of the Palouse region, the terrain is largely under cultivation to various grains, especially to wheat, and the natural cover is restricted to small water courses and the margins of roads.

RIPARIAN

Along watercourses the dominant shrubs are: Salix Bebbiana, S. bella, S. lasiandra, Alnus tenuifolia, Rubus parviflorus, Amelanchier florida, Crataegus Douglasii, Rosa nutkana, R. ultramontana, Sambucus glauca, Physocarpus pauciflorus, P. capitatus, Symphoricarpus albus, Philadelphus Lewisii and frequently Prunus virginiana var. demissa and P. emarginata. Ribes lacustre, inerme, irriguum, and petiolare are frequent.

In well-drained meadows and abundant locally is Lupinus retrorsus, giving a characteristic aspect to the herbage.

In the lower ground, Iris missouriensis is a frequent conspicuous plant extending as far east as Boville. Numerous grasses and sedges, both native and introduced, are intermixed with the herbaceous vegetation of the meadowland.

RUDERAL

Conspicuous on the drier ground are: Rosa nutkana and R. ultramontana, heavy with bloom in early summer, Achillea millefolium, Potentilla gracilis, Sisymbrium altissimum, Lotus americanus, Leptotaenia multifida, Rumex mexicanus, R. crispus, Geranium viscosissimum, Cirsium lanceolatus, C. palousense, Sidalcea oregana, Clematis hirsutissima, Galium boreale, Epilobium paniculatum, Veratrum Jonesii, Balsamorrhiza sagittata, Wyethia amplexicaulis, Antennaria luzuloides, Pentstemon attenuatus, Triteleia hyacinthina, T. grandiflora, and Castilleia lutescens or C. lutea.

In occasional roadside pools may be found Potamogeton natans or Sparganium simplex or sometimes Lemna minor or Spirodela polyrhiza.

In meadows the beds of dried vernal pools may become whitened with Plagiobotrys scopulorum or made blue with Downingia elegans.

In thin soil of outcrops Clarkia pulchella may occasionally be found and Allium cuspidatum, Polygonum polygaloides and Arenaria congesta.

It is only in the deep water-courses of the tributaries of the Clearwater River that Alnus rhombifolia has been observed. The characteristic shrub of the transition belt between the Yellow Pine and Snake River plains is the ubiquitous Artemisia tridentata, the Chaparral Sage in Pine Valley, abundant in the north slope and varying in size from dwarf plants scarcely a foot tall to individuals quite [illegible].

Philadelphus Lewisii is also a conspicuous plant along tiny runs and Pentstemon venustus adds clumps of rich color. Beneath the yellow pine of the upper canyon near Orofino, Monardella odoratissima is frequent, and Hypericum perforatum, abundant and increasing in range. These regions, however, are somewhat beyond the limits of the present work.

LACUSTRINE

Lakes and the associated marsh land which occurs in the north-central part of our area, support a varied aquatic flora. Nympozanthus polysepalus is always a conspicuous element, especially where marshland meets lake. Brasenia Schreberi is occasionally seen and locally abundant.

Along the shallow shores of lakes occur several species of Potamogeton such as P. Richardsonii, P. natans, P. amplifolius, P. gramineus and P. pusillus.

In shallow muddy lagoons Utricularia vulgaris is frequent.

On sandy shelving lake bottoms through crystal clear water may be seen numerous individuals of Isoetes Braunii and I. Howellii, locally very abundant.

Along lake margins Sagittaria cuneata and S. latifolia are frequent.

In lagoons which become partially dry in the summer, Comarum palustre or Alisma plantago-aquatica are conspicuous, and, with sedges, fre quently cover large areas.

Along the rockier lake shores Populus balsamifera is the common tree; Juniperus scopulorum is seen occasionally on the shores of Lake Pend Oreille and upper Priest Lake.

In alluvial embayments Populus tremuloides var. aurea reaches its greatest development in our region.

In drying marshy meadows adjacent to lakes or ponds may occur plants such as Nymphozanthus polysepalus which under these conditions, is stranded and nearly terrestrial, Comarum palustre, Menyanthes trifoliata, Typha latifolia, Dulichium arundinaceum, Hypericum majus, Acorus Calamus, Scutellaria galericulata, Naumbergia thyrsiflora, Polygonum natans, Veronica scutellata, Mentha arvensis, Lycopus uniflorus, and L. americanus, with Spiraea Menziesii fringing drier margins.

FOREST VEGETATION

The forested area of our region lies chiefly south of the Clark Fork Valley between the Montana border and the irregular line drawn somewhat diagonally from the lower end of Lake Pend Oreille through St. Maries and Boville to Pierce. North of the Clark Fork Valley, in the Pend Oreille and Kaniksu National Forests, the forest is well developed, but on the east it descends irregularly in isolated patches. Along the western margin it straggles out slowly, passing finally into the grassland. Upon the southern margin it disappears south of the Lochsa River. It is within this forest that the "white pine type" occurs.

This region, however, does not support a continued and unbroken mature forest. In the lower lands, early logging operations, together with sanguine but often abortive attempts at homesteading have modified the stand to some extent. The most profound and active agent of destruction both in the lowlands and within the mountainous interior has been fire, often the result of severe electrical storms. With the destruction of the forest canopy through successive fires and the reduction of the thick duff to ashes, it is obvious that the ecological conditions are greatly modified. Ignoring the burned areas and considering only those in which young or mature stands are thrifty and well developed, the forest has been classified into five principal types. In some places these may be readily discerned, in others they merge and anastomose in a confusing way. Almost nowhere can the climax be thought of as being complete, but only approximating the ideal and shadowing the associations which would prevail generally if the external factors producing them were more uniform.

YELLOW PINE TYPE

The yellow pine type ranges along the eastern border of the grassland, competing with it, from the Clark Fork Valley west of Lake Pend Oreille, southward to Moscow, and eastward to Orofino, descending into the Clearwater canyon and the canyons tributary to it. This strip is continuous with the forests of the Spokane plains. From east to west it varies in width from a few hundred yards to several miles, penetrating deeply in-

to the more moist forests along the north banks of all the broader streams. It also occupies the western slopes of the massive mountains in the northeast. Along the borders of the grassland, in limited areas, this type forms typical park-like stands. Reproduction of its own kind is the common understory and is frequently dense. In mixed stands the most common associate is lodgepole pine, Pinus contorta, which is slowly crowded out. Inasmuch as the pure stands are limited in area and are commonly contiguous to stands dominated by Douglas fir, Pseudotsuga taxifolia, the associated shrubs are commonly those of the Douglas fir type, such as Physocarpus pauciflorus, Holodiscus discolor, Ceanothus sanguineus, and C. velutinus, Philadelphus Lewisii, Symphoricarpus albus, Prunus virginiana var. demissa and Spiraea corymbosa. The ninebark, Physocarpus pauciflorus, is perhaps the most abundant, although in arid flats where lodgepole pine is abundant, Ceanothus velutinus is dominant. Herbs commonly associated are Pentstemon ovatus, P. attenuatus, Thalictrum occidentale, Galium triflorum, Synthyris rubra, Erythronium grandiflorum (flowering in early spring), Pteridium aquilinum, Smilacina racemosa, Drymocallis convallaria and Sieversia ciliata.

DOUGLAS FIR-LARCH TYPE

Merging with the yellow pine, particularly on low hills and usually occupying thin-soiled slopes with southern exposure, is an association dominated by Douglas fir, Pseudotsuga taxifolia, commonly with larch. Larix occidentalis. In our region it rarely is found in extensive stands and then chiefly in the valley of the Clark Fork west of Lake

Pend Oreille and west of Lake Coeur d'Alene. It would appear as a temporary but necessary interloper, seeming not to reproduce itself but to be replaced on the one hand by yellow pine, upon the other by larch and white pine, Pinus monticola. It frequently replaces stands of lodgepole pine which have arisen after severe and repeated burnings. It may extend well up to the zone dominated by Abies lasiocarpa. Its associates vary considerably with the terrain.

Its most common shrub associates are Physocarpus pauciflorus, Holodiscus discolor, Prunus emarginata, Amelanchier florida, Pachystima Myrsinites, Spiraea corymbosa, Philadelphus Lewisii, Mahonia repens, Ceanothus sanguineus, and C. velutinus.

The commonly associated herbs are: Clarkia rhomboidea, C. pulchella, Sedum Douglasii, Polygonum Douglasii, P. polygaloides, Cryptogramma crispa, Scutellaria angustifolia, Delphinium Nelsoni, Collomia linearis, Achillea millefolium, Eriogonum heracleoides, Lupinus sericeus, Heuchera glabella, Arenaria congesta and Antennaria rosea. Since the soil is thin and outcrops are frequent, the herbs are often annuals of xerophytic type.

In the southwestern part of our area, where the situations lean toward the moister Thuja climax, frequent intermixtures of Douglas fir and low-land fir may occur, often with a sprinkling of white pine.

In the region of the lakes, where the Douglas fir-larch type is best

developed, are to be found a number of herbaceous species which are rare within our region. Examples of such are: Phlox Douglasii, Orthocarpus tenuifolius, Physaria Geyeri, Trillium petiolatum, and Silene Scouleri.

In dry open places and along rights-of way there also occur occasional entrants from the plains or Rocky Mountain floras which do not appear to be normal inhabitants of our region. Such are Monarda menthaefolia, Rhus Toxicodendron, Thalictrum purpurascens, Ribes aureum, Clecne serrulata and Astragalus tenellus.

On the well-drained flats of the Kootenai valley Corylus rostrata var. californica and Shepherdia canadensis are abundant. I have also found the latter occasionally in similar situations near Priest Lake but nowhere else, although I am informed by Mr. J. H. Christ that it is common on the north and west sides of Lake Pend Oreille.

Judging from the nature of its associates as well as from its own reactions, it seems not improbable that the Douglas fir-larch type represents an extension westward of the similar but extensive forests of northwestern Montana, which, because of edaphic factors, is able to maintain itself precariously in restricted areas which are unfavorable for yellow pine and at the same time unfavorable for the white pine type. As suggested by Mr. J. H. Christ in a personal communication, it may represent an ecotone between the yellow pine and white pine types.

WHITE PINE TYPE

The forests which are at present most valuable, lie within the association which has been designated by foresters as the white pine type. The conviction is inescapable that in certain restricted situations at intermediate elevations, such as broad alluvial bottoms and gentle slopes with northerly exposure and upon similar benches, the climax of this type is represented by stands of Thuja plicata. The effect of repeated burning has seemingly prevented completion of succession in all but a few sites, and these vary in composition as one passes from the north to the south. In the north, in the Pend Oreille and Kaniksu forests, Tsuga heterophylla reacts as a codominant and indeed would appear even to replace the longer-lived Thuja, inasmuch as Tsuga is the principal constituent of the understory in the best developed Thuja groves. Whether a Thuja or Tsuga climax would be attained generally throughout the white pine type is questionable. The critical nature of (a) the climate with respect to the growth of Thuja plicata and Tsuga heterophylla, (b) the basic difference in underlying rock (in contrast with that of the Pacific Coast mountain ranges) which characterizes most of our region, and (c) the ever-recurrent fires which must be reckoned with as a natural factor of environment for long periods past, react together to limit the actual attainment of this climax except in very local areas. As a result of these factors the subclimax of the Thuja and Tsuga formation, the "white pine type" of the foresters, has assumed the practical role of the climax throughout most of the for-

ested area. This type is composed in varied proportions of white pine, white fir, larch and Douglas fir.

The white pine type varies considerably in composition north of the Clark Fork and, again, south of it. In the north, Tsuga heterophylla is abundant and associated with it are numerous abundant species commonly reckoned as inhabitants of the Cascade or Canadian floras. These do not appear south of the Clark Fork, or if so, not abundantly. Such plants are Oplopanax horridum, characteristic of small shaded streams; Vaccinium ovalifolium, locally abundant on the floor of mature woods; Rubus spectabilis and R. pedatus, the latter abundant on the mature forest floor of the upper Priest River; Stenanthium occidentale, frequent in moist meadows; Habenaria orbiculata, and Corallorhiza trifida in deep woods; Drosera rotundifolia, D. longifolia and Oxycoccus palustris in sphagnum bogs under Betula pumila var. glandulifera; Dryas octopetala, Phyllodoce glanduliflora and Cassiope Mertensiana on highest peaks and ridges; Rhododendron albiflorum, an important constituent of subalpine brush; Leptarrhena pyrolifolia, Tellima grandiflora, Mitella trifida, Comandra livida, Lilium columbianum, Ribes acerifolium and Pentstemon albertinus. Other genera such as Pyrola, Lycopodium and Mitella, while found elsewhere less extensively, are represented in the north by several species each of which is frequent in occurrence. The converse is also true: many species which are frequent south of the Clark Fork do not occur north of it, or but sparingly.

The nature of the white pine type may best be suggested by a sketch of succession within the type after a fire. Such succession is variable, because of local conditions and the conditions of the burning, and any short statement must be understood as being approximate, presenting something in the nature of a composite view. Let us assume a slope with more or less northerly exposure which is forested primarily with white pine, white fir, cedar and Douglas fir in the order named, the age class being approximately 120 years. Within this forest the shrubs are sparse and generally few, being such as Rosa gymnocarpa, Vaccinium membranaceum, Ribes viscosissimum, R. lacustre, Pachystima Myrsinites, Rubus leucodermis, R. parviflorus, Acer Douglasii, Menziesia glabella, and Amelanchier florida. Low herbs are abundant, such as Cornus canadensis, Coptis occidentalis, Polystichum munitum, P. Lonchitis, Smilacina sessilifolia, Viola orbiculata, Mitella stauropetala, Valeriana sitchensis, Anemone Piperi, Disporum oreganum, Osmorrhiza nuda, Clintonia uniflora, Chimaphila umbellata, Hieracium albiflorum, Aster conspicuus, Tiarella unifoliata, Galium triflorum, Fragaria americana, Adenocaulon bicolor and Trillium ovatum.

Adjacent to and in continuation of the same slope is a burn of several hundred acres which we shall assume occurred ten years previously, a hot fire which, for the most part, reduced the duff to ashes. The tall whitened trunks are mostly standing--a ghostly forest which becomes violescent and transformed when caught in the slanting western sun. The ground is barren of any detritus, gravelly and with frequent outcrops and ledges which were deeply hidden within the living forest

and covered then by a thin soil. Living trees there are none. The most abundant plants are shrubs such as Spiraea corymbosa, Rubus parviflorus, Ceanothus sanguineus, Salix scouleriana, Acer Douglasii, Holodiscus discolor, Mahonia repens, Betula papyrifera, Ceanothus velutinus, Ribes viscossissimum, Prunus emarginata, Lonicera utahensis, Populus trichocarpa, Vaccinium membranaceum, Sorbus sitchensis, Symphoricarpos albus, and Ribes lacustre. The degree to which any are represented varies greatly with local conditions. Frequently Salix scouleriana will dominate, frequently Spiraea corymbosa, sometimes Rubus parviflorus or Ceanothus velutinus. Intermixed with them, but sparsely, are herbs. Chamaenerion angustifolium is often abundant, however, and is characteristic, especially in the moister places, sometimes appearing within a few months after the burning. Other are Astragalus Mortoni, Heuchera glabella, Epilobium paniculatum, Sphaeralcea acerifolia, Cirsium lanceolatum, C. foliosum, Achillea millefolium, Solidago elongata, Hieracium albiflorum, H. albertinum, Phacelia heterophylla, Smilacina sessilifolia, S. racemosa, Anaphalis margaritacea, Gnaphalium microcephalum, G. Macounii, Senecio pseudaureus, Lactuca spicata, Vicia americana, Xerophyllum tenax, Pteridium aquilinum, Pyrola secunda. In moist areas or in light burns more and more of the original herbaceous or shrubby vegetation is found. Scattered throughout the shrubby vegetation and herbs is to be found the early coniferous reproduction, ranging in height from a few inches to a foot or more. The most abundant and the largest, this having been a severe burn, is Pinus contorta, smaller and less abundant are Pinus monticola, Abies grandis, Pseudotsuga taxifolia, Larix occidentalis, and Thuja plicata. In the north, Tsuga heterophylla is a common early entrant.

As this very young forest grows, the larch commonly outstrips its companions, and thus serves as a nurse crop for the other tree species, and is often the first forest tree to disappear. Abies grandis and Pseudotsuga taxifolia disappear slowly, and in favorable spots the white pine, together with some larch and Douglas fir, ultimately forms the subclimax, seeming in some cases to persist for two or more generations. As the forest approaches maturity, Thuja plicata, because of its greater shade tolerance, becomes more and more apparent in the understory. Depending upon the nature of the exposure, elevation and soil, saplings of this species, often dense and forming thickets, may or may not reach their normal development. As has been previously stated, the climax is reached in comparatively restricted areas or not at all.

Those areas which have reached the climax are of great beauty and richness. The trunks of the great cedars glow warmly in the diffuse light which, especially in the north, where it is diffracted by the lacery of hemlock foliage, takes on an opalescent quality. The ground cover is scant, and one may stride freely in all directions. There are occasional fallen trunks deep in decay and covered with mosses and trailing Linnaea borealis and Rubus pedatus, or bright with star-like Moneses uniflora. The shrubs are few and straggling, being chiefly Rubus parviflorus, Vaccinium membranaceum and Pachystima Myrsinites, with Acer Douglasii and Oplopanax horridum in springy places. Moist spots are brightened with rankly growing ferns such as Athyrium filix-foemina and Dryopteris filix-mas. On the dryer floor where the duff is dense

Dryopteris Linnaeana make a delicate mosaic. In areas too deeply shaded for light brush, societies of low herbs are found, such as Smilacina sessilifolia, Streptopus curvipes, Tiarella unifoliata, Clintonia uniflora and Coptis occidentalis. Corallorhiza, Pyrola and Lycopodium are represented by various species.

Within the circuit of this forest are frequent natural meadows. Their floras vary according to the size and consequent shade from the forest, the degree of drainage and their elevation. In the lowlands they may be several acres in extent or more, commonly moist in spring, becoming drier in summer. Amongst the early plants of such meadows, three in particular are often associated: Camassia quamash, Polygonum bistortoides and Pentstemon Vaseyanus, flowering in the order named. Variously associated with them are Habenaria dilatata Spiranthes Romanzoffiana, Ranunculus Populago, R. maximus, Rhamnus alnifolia, Geum macrophyllum, Vaccinium caespitosum, Trautvetteria grandis, Potentilla Nuttallii, Hypericum anagalloides. In somewhat more boggy meadows Veratrum caudatum is a very conspicuous and abundant plant. In drier, better drained meadows Potentilla gracilis, Castilleja miniata, Gentiana Oregana, Galium boreale, Achillea millefolium, Pedicularis latifolia, Sidalcea oregana, Pentstemon procerus, Castilleja lutea, Vicia [illegible] are familiar plants.

On small sand bars characteristic associations of small herbs are [illegible] seen: Pedicularis groenlandica, Habenaria saccata, [illegible]. [illegible]

cies according to the elevation and geographical situation. Boykinia major is abundant along the margins of streams in the St. Joe and Clearwater forests. Ribes petiolare, R. inerme, Rhamnus Purshiana, Alnus tenuifolia, A. sinuata, Amelanchier florida, Rubus parviflorus, Streptopus amplexifolius, Viburnum pauciflorum, Acer Douglasii, Cornus stolonifera, Symphoricarpas albus, Lonicera involucrata, Sambucus glauca, S. melanocarpa, Trautvetteria grandis, Senecio triangularis, Ligusticum Leibergii are characteristic plants of the margins.

In swampy bottoms in addition to willows, the following are common: Crataegus Douglasii, Alnus tenuifolia, Ribes inerme, Cicuta vagans, Angelica Lyallii, Trautvetteria grandis, Heracleum lanatum, Mentha arvensis, Veronica americana, Polemonium occidentale, Hypericum anagalloides, Scutellaria galericulata, Gnaphalium palustre, Ranunculus maximus, Accnitum columbianum, Viola palustris, Urtica Lyallii, Senecio triangularis, Ligusticum Canbyi, Cyperus inflexus, Mimulus guttatus M. moschatus, M. Tilingi, and Epilobium adenocaulon. Occasionally at intermediate elevations occur sphagnum bogs in which Betula pumila var. glandulifera is the most striking woody plant. Pinus contorta is commonly associated with it. Spiraea densiflora at higher, S. Menziesii at lower elevations, often fringe the bog. Ledum glandulosum is frequent in such bogs at higher elevations. Amongst herbaceous plants commonly present may be found Viola palustris, Cyperus microcarpus, Saxifraga integrifolia, Senecio triangularis, Pedicularis groenlandica, Habenaria dilatata, H. saccata, Hypericum anagalloides, Tofieldia occidentalis, Caltha leptosepala, Veronica americana, Juncus ensifolius, Spiranthes Romanzoffiana and Dodecatheon integrifolium.

SUBALPINE FIR TYPE

A beautiful and striking forest is developed chiefly above five thousand feet, which is clearly defined, for the most part, and dominated by Abies lasiocarpa. Associated are stragglers from lower elevations but particularly Picea Engelmannii, and Pinus contorta, and in the south Tsuga Mertensiana. Each of these associates, in some restricted areas, often appears to maintain a subclimax. The forest is open, the individuals being widely spaced with narrow spire-like crowns which reach to the ground.

Brush is dense, especially on the northern slopes. It is composed primarily of Menziesia glabella, Lonicera utahensis, L. involucrata, Vaccinium membranaceum, Sorbus sitchensis, Sambucus melanocarpa, Ribes lacustre, and, in the north, Rhododendron albiflorum.

Along alpine streams may be found Spiraea densiflora, Ribes petiolare, R. lacustre (and locally in very restricted areas R. acerifolium, R. triste and R. laxiflorum var. coloradense), Trautvetteria grandis, Boykinia major, Ligusticum Leibergii, Mimulus Lewisii, Habenaria saccata, Streptopus amplexifolius, Montia asarifolia, Epilobium Hornemanni, Saxifraga arguta, Parnassia fimbriata, Cardamine oligosperma and Ranunculus Douglasii.

Frequent seepage spots, particularly on the north slopes, may be densely covered with thickets of Alnus sinuata, or Sorbus sitchensis, or both, the stems decumbent and forming difficult tangles. Small springs com-

monly arise in these spots. Ribes lacustre is almost always present here in abundance, together with Sambucus melanocarpa and numerous herbs: Veratrum viride, Actaea arguta, Montia asarifolia, Viola glabella, Disporum oreganum, Smilacina stellata, Trillium ovatum, and Erythronium grandiflorum.

The subalpine meadows are areas of especial beauty, being crowded with herbaceous plants of varied aspects and color: Xerophyllum tenax, Ligusticum Leibergii, Castilleia mineata, Pedicularis siifolia, P. contorta, P. groenlandica, Aconitum columbianum, Delphinium occidentale, Saxifraga integrifolia, Dodecatheon integrifolium, Polygonum alpinum, Habenaria dilatata, H. saccata, Rudbeckia occidentalis, Aquilegia flavescens, Thalictrum occidentale, Angelica Dawsonii, Mertensia paniculata, Heracleum lanatum, Juncus ensifolius, Senecio megacephalus, S. triangularis, S. exaltatus, Polygonum bistortoides var. linearifolium, Mimulus guttatus, M. moschatus, Valeriana sitchensis, Stellaria obtusa, S. umbellata, Ranunculus Douglasii, Veronica americana, Galium bifolium, Saussurea americana, Arnica diversifolia, A. mollis, Aster Canbyi, Erigeron salsuginosus and Geum macrophyllum.

On moist ridges above meadows may found many of the same plants but with additional species which are usually local and restricted in their range, such as Heuchera grossulariaefolia, Castilleia gibba, Viola bellidifolia, Phlox Douglasii, Astragalus Bourgovii, Eriogonum Piperi, and Anemone occidentalis.

Associated in small depressions near melting snow are Trillium ovatum, Erythronium grandiflorum, Polygonum bistortoides var. linearifolium, Ranunculus Eschscholtzii and Trollius laxus var. albiflorus.

Talus slopes at high elevations are frequent, resultant from the disintegration of cliffs. The most common entrant on these is Xerophyllum tenax and associated with it is often Polygonum alpinum, Arabis sparsiflora, Spiraea corymbosa, Amelanchier florida, Juncus Parryi, Vaccinium membranaceum, V. scoparium and Prunus emarginata. After soil is established by these agents, the slope is often slowly taken over by Abies lasiocarpa and Tsuga Mertensiana. Xerophyllum tenax is characteristic of high ridges and open slopes.

Frequently on rounded peaks or in moist depressions at high elevations, there occur pastures of varied size in which Luzula glabrata is almost the sole inhabitant or very abundant.

In a few restricted areas on northerly moist benches at higher elevations, sometimes pure stands of Picea Engelmannii with abundant reproduction occur. This species, with Abies lasiocarpa, often descends to the margins of boggy meadows at elevations as low as 2000 feet.

At the highest elevations Pinus albicaulis is usually found. It commonly occupies ridges above 6000 feet, intermixed with Abies lasiocarpa or Tsuga Mertensiana, or forms pure stands. Associated with it are often found Vaccinium myrtillus, Xerophyllum tenax, Vaccinium scoparium, Menziesia glabella, Luzula glabrata and Juncus Parryi.

On one abrupt ridge and around the cirque lake near the summit of Roman Nose Mountain is found the only stand which is known to the author, of Larix Lyallii.

On the tops of a few peaks, such as Snowy Top, Roman Nose and Scotchman, are found restricted tundra relicts with such species as Luzula glabrata, Juncus Parryi, Dasiphora fruticosa, Dryas octopetala, Phyllodoce glanduliflora and Cassiope Mertensiana.

BOTANICAL EXPLORATION IN NORTHERN IDAHO

Botanical exploration of northern Idaho began with the historical overland journey of Lewis and Clark in the years 1804-06. For the itinerary of this expedition we have primarily the running account of Lewis. The party crossed the Bitter Root Mountains southwest of the present site of Missoula. The choice of this route was not fortuitous but was based upon the existence there of an Indian highway, the Lolo trail which follows the divide between the Locksa and Clearwater rivers. This is an ancient highway which according to J. E. Kirkwood (Sci. Mo. 26: 315-328. 1928), "was an old trail, no one knows how old, when Lewis and Clark travelled it in 1805. It was important as being the natural route from the Nez Perce country of the Lower Snake River to the plains of the Missouri by way of Clarks Fork and Blackfoot Rivers". According to C. V. Piper, "Hungry Creek" and "Collins Creek" both refer to the present Lolo Creek. The Clearwater River, called the "Kooskooskee" by Lewis, was reached near the present site of Orofino and at this point

canoes were built in October, 1805 for the journey which ultimately took them down the Columbia. During the course of this journey Lewis had made botanical collections and referred to many of these in his narrative. Unfortunately, these collections, made on the more leisurely westward trek, were lost in the Columbia by wreck of one of the canoes, and the identity of many of the plants referred to by Lewis must consequently remain in doubt. Upon the return journey, collections were made to replace those which were lost, numbering about 150 species, but they were principally late season species, taken chiefly east of our limits. However, a camp was established near the present site of the town of Kamiah, in May and June, 1806, and collections were made there and at "Quamash Flats," now known as Weippe meadows, near the town of Weippe (pronounced We-ipe). It is these which form the classical nucleus of the Idaho flora and include such species as Scutellaria angustifolia, from Camp Chopunnish, and Camassia quamash an Polygonum bistortoides, from Quamash Flats. All may be examined today in the herbarium of the Philadelphia Academy of Natural Sciences.

In addition to the manuscript notes of Lewis which appear on some of the specimens, there are also appended notes by Frederich Pursh (1774-1820)* who described and figured some of the species in his Flora Americae boreali-septentrionalis (1812). During 1897, B. L. Robinson and J. M. Greenman studied the Lewis plants and annotated

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* Pursh, A German by birth, was christened Friedrich Traugott Pursch.

them with the then current names. Most sheets, therefore, bear three separate tickets from three sources. Elliott Coues, ornithologist and bibliographer, has written a critical commentary upon the botanical collections of the expedition (Proc. Phila. Acad. Nat. Sci. 1898: 291-315).

The next figure to appear in our region was David Douglas, (1799-1834) whose classical and extensive collections are the basis for the study of the flora of the Northwestern States and California. Douglas collected but little in Idaho, however, but on July 24, 1826, he was at the mouth of the Clearwater River and between July 24 and 30, was at Lewiston and in the adjacent Craig Mountains.

Following Douglas, in 1832-33, came the Boston fur-trader, Nathaniel Jarvis Wyeth (1802-1856), who, on his return journey crossed northern Idaho, following the Clark Fork to its junction with the Missoula. He made a small plant collection along the Flathead River in Montana, but apparently preserved no collections from northern Idaho. He was accompanied on a second journey (1834) by Thomas Nuttall, but did not reach as far north as our region. Dr. Charles Pickering and Mr. W(illiam)D(unlop) Brackenridge, botanists of the Wilkes Expedition, reached Lapwai, Idaho on June 25, 1841, but apparently made few if any botanical collections in the vicinity.

The next botanical collector in this region, therefore, and in importance second only to Lewis, was the German, C(harles) A(ndreas) Geyer (1809-1853), who had collected in Illinois previous to his journey to Idaho. In November 1843, Geyer crossed a high spur of the "Green

(Bitter Root) Mountains" to the Coeur d'Alene River and wintered at the Chamokane Mission, located on Chamokane Creek about 10 miles from its junctions with the Coeur d'Alene River. During the summer of 1844 Geyer made trips northwestward as far as Fort Colville, southward to the Palouse River, Nez Perce, and the Lapwai Mission. Some of his most important collections were made in the spring in the vicinity of Lake Coeur d'Alene and Skitsoe Lake. Late in the season of the same year, he botanized in the Craig Mountains, and, passing around the Blue Mountains, reached Fort Walla Walla, from whence he descended the Columbia, bound for Fort Vancouver and England. Geyer wrote of Camassia prairies under the designation "Ganasa prairies" and tells of his hungry horse having browsed upon "Taxodium sempervirens" (p. 205). His collections were all numbered and can be fairly closely placed by his narrative (Hookers London Journ. Bot. 5: 201-208, 285-310, 509-524. 1846). There is evidence from his detection of such infrequent species as Orcbanche pinorum that Geyer was a sharp-eyed collector. He showed an interest in placing manuscript names upon his collections before submitting them to Hooker; many of these names were employed by Hooker in publishing his species.

At the time of Geyer's visit to the Lapwai Mission the American missionary, Rev. Henry Spalding, was in residence there. Spalding sent a number of plants to Asa Gray. Astragalus Spaldingii, Gray, commemorates this association and Spalding's interest in the native plants. Piper (Contrib. U. S. Natl. Herb. 11: 16) has recorded the best available notes on Spalding.

John Pearsall accompanied the Mullan Expedition of 1858-62 in connection with the construction of a military road, along the present Northern Pacific RR., from Montana into Idaho and along the Coeur d'Alene branch. The party wintered [redacted] at the village of St. Mary's (St. Maries). His material is in the Gray and Britton herbaria. No botanical report of Pearsall's collections was ever published.

Dr. J(ames) G(raham) Cooper enumerated the notable trees observed in 1860 in crossing from Fort Benton to Fort Colville. He made a stop at Coeur d'Alene Mission after crossing Mullans Pass. He writes of the "western Pogue-Birch", Betula papyrifera var. occidentalis, along Coeur d'Alene River, where it becomes "two feet in diameter and sixty feet in height, of handsome appearance". He was also deeply impressed by the "Thuja swamps" along the west slope of the Coeur d'Alene Mountains. Cooper was an accurate observer and his account of the forest trees of our region affords very interesting reading today (Am. Nat. 3: 404-422. 1869).

John Buttle, member of David Lyall's "Oregon Boundary Commission" party (cf. Piper, 16), collected near the Washington-Idaho-British Columbia borders, or "ad montes Pend Oreille et Kootenay" and on Mooyie River, in 1860. These collections in Gray and Hooker herbaria, bear the name of Lyall on the tickets.

In 1880 Sereno Watson visited Lolo Pass from the Montana side in connection with the Tenth Census survey of the forests.

J(ohn) H(erman) Sandberg made collections about Granite, Bonner County, in July 1887.

On August 8, 1889, Professor Edward Lee Greene, then of the University of California, botanized at Lake Pend Oreille where the type of Cicuta vagans was taken (Pitt. 2: 9.)

In June-July 1892 George B(riggs) Aiton collected in the Palouse country and about Lake Coeur d'Alene. On 28 June 1892 A. I(sabel) Mulford collected at Curlew Gulch.

Prof. E. R. Lake and Mr. W. R. Hull collected in June 1892 in Latah County.

In 1892 four botanists, J. H. Sandberg, J. B. Leiberg, D. T. MacDougal and A. A. Heller collected in Latah and Nez Perce counties. Their exsiccatae were distributed through the office of the U. S. Department of Agriculture.

Charles Vancouver Piper collected in the Cedar Mountains in July 1893, and also, on another trip, at Priest Lake.

In June 1894 Louis F(orniquet) Henderson collected at Camas Prairie, and in August on the Cedar Mts. Other places he also visited. His collections were intelligently taken and fortunately distributed to eastern herbaria, for his original set was lost in a fire at the University of Idaho about thirty-five years ago.

That John B(ernhard) Leiberg (1853-1913) holds first place among recent explorers from the standpoint of quantity of material collected in northern Idaho, there can be no doubt. Leiberg's collections were both representative and thorough for the region under consideration. They were widely distributed to the larger herbaria and form a valuable reference exsiccata. During the summer of 1895 Leiberg collected along the North Fork of the Coeur d'Alene River, Sohons Pass,

Stevens Peak and Weissners Peak. He reported upon a timber survey of Priest River Forest Reserve made in 1897 in Nineteenth Annual Report, U. S. Geol. Surv. 5: 217-252. 1899. The general topographic features of the Priest River drainage basin are therein described. In the same volume Leiberg describes the Bitter Root Forest Reserve to the south.

In June 1896 Amos Arthur and E. Gertrude Heller collected at Lake Waha, Nez Perces Co., their specimens being very widely distributed to herbaria.

A(dolph) D(aniel) E(dward) Elmer collected at Viola, Latah Co., in 1896-97.

LeRoy Abrams, as a youthful student, made collections about Moscow, June, 1900.

S. O. Johnson collected about Coeur d'Alene in May 1909.

R(olla) Kent Beattie collected in 1911 in the Summer Range of Latah Co.

More recent collectors in the area, apart from the senior author, some having collected extensively, others but once, include J. H. Christ, H. D. House, H. J. Rust, W. W. Eggleston, Henry Putnam, Gerhardt Kempf, Miller Houck, Harold Offord, Wm. A. Rockie, Howard R. Flint, Lincoln Ellison, Floyd Gail, T. E. Gail, T. E. Holman, J. E. Kirkwood, J. A. Larsen, H. St. John, G. Neville Jones, Lincoln Constance, F. A. Warren, C. Leo Hitchcock, Fred Barkley, and F. W. Pennell.

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INTRODUCTION TO THE USE OF A MANUAL

CLASSIFICATION

The object of this volume is to assist in ascertaining the names and relationships of the plants which grow in northern Idaho. The several hundred species dealt with are arranged in larger groups known as genera. These in turn are assembled into groups known as families. A species may be simply defined as one of a group of similar organisms of common descent and close relationship. For example: familiar species are the blackberry, raspberry and thimbleberry. These three species, together with other similar ones, compose the genus Rubus. Rubus, Fragaria (strawberry), Potentilla (cinquefoil), Geum (avens) and other related genera compose the family Rosaceae.

In seed plants the primary organ for determination of such relationships is the flower and its product, the fruit. It is primarily upon resemblances and dissimilarities in flower structure that the bases for classification are found. For the benefit of those who may never have studied botany, the more common types of flowers

and the terms used in describing them will be briefly discussed. For more detailed information the reader is referred to such works as Pool's "Flowers and Flowering Plants," or a general text such as Holman and Robbins' "General Botany" (4th ed.).

There are two subdivisions of the seed plants, namely gymnosperms (commonly known as conifers), and angiosperms (or flowering plants). In a broad sense the cones of the gymnosperms are flowers. The cones are of two kinds, one less conspicuous and ephemeral which bears pollen and one bearing ovules which eventually form seeds. The ovules (and seeds) are borne upon the surfaces of modified leaves called sporophylls (or more commonly cone scales), and are usually subtended by a more or less conspicuous sterile leaf called the bract. In Juniperus the scales are fleshy, rather than woody, and coalesce to form a berry-like fruit with 2-3 seeds. In Taxus a fruit resembling a cherry is formed.

The ordinary flower of the angiosperms consists of a stalk upon which are borne several series of highly modified leaves. These may be spirally arranged but are usually in whorls, that is, in circlets, there being normally four whorls in a flower. From the outside passing inward, the whorls are designated: the calyx, the corolla, the stamens and the pistil (or pistils). Component parts of the calyx are called sepals, of the corolla, petals. The calyx and corolla are known collectively as the perianth. The stalk of the stamen is called the filament, the pollen-bearing sacs, the anthers. The ovules are contained within the ovary of the pistil, the slender projection into which

it tapers is called the style, and the receptive spot which receives the pollen is the stigma.

Exceptions to this "ideal" floral plan are frequent. For example, a flower may consist either of stamens or of pistil only, as in the willow; or may consist of stamens and pistil only, as in the grasses; or may consist of calyx and stamens and of calyx and pistil as in Amaranthus; or may have only the corolla wanting as in some maples. In certain genera there is little or no difference between the calyx and corolla, as in Eriogonum, or in Lilium.

The calyx is usually green and consists of usually five parts (sometimes 3-6 or more). These parts, the sepals, may be completely separate and distinct, or may be variously united to form a bell-shaped or tubular cup. The corolla is usually colored or white, more conspicuous and larger than the calyx. Its parts, the petals, may also be free or may be joined together, either partly, as in Phacelia, or wholly, as in the morning glory. When joined together, the petals may take the shape either of a saucer, as in Solanum, or may form a tube as in Gilia. Either the calyx or the corolla or both may be irregular in the sense that a single plane only will divide them into two similar halves, as in the pea, or in the Indian paint brush, Castilleia. In this case the calyx or corolla is said to be zygomorphic. In flowers with tubular corollas the stamens are commonly attached to the wall of the corolla tube.

The stamens may be either numerous and indefinite in number, as in the buttercup, or few, in which case they are generally 5, 6 or

10. They may be completely separate or their filaments may sometimes be joined into a tube which surrounds the ovary, as in Lupinus or Sidalcea. Less often the anthers may be joined into a tube, the filaments being free, as in the Campanulaceae and Compositae. They may be seated at the base of the ovary as in Allium, on a shelf of the calyx tube as in Prunus, or above the ovary as in Mitella and the evening primrose family.

The pistils may be several or numerous as in the buttercup, and in the strawberry, or solitary in each flower as in Allium. If several, the pistils are simple, that is, formed of a single carpel. If one, the pistil is usually compound, that is, formed of two or more carpels, the presence of which is usually indicated by the number of styles or style branches or by the number of chambers in the ovary. The pistil may be entirely free from any flower parts, and seated above them, as in Allium, in which case it is said to be superior and the stamens hypogynous; it may be free from the flower parts but surrounded by a cup-like calyx upon which are seated the stamens, as in Prunus, in which case the ovary is → superior and the stamens are said to be perigynous; finally, the ovary may be either partly or wholly joined to the calyx-tube and seated more or less beneath the calyx-lobes, petals and stamens, as in Mitella, in which case the ovary is said to be inferior and the stamens epigynous.

If one compares the flowers of the families herein described with these essential generalizations in mind, he may arrange them in three ascending series according to certain principles. It is believed

that these three series represent in a general way the probable paths of evolution in the flowering plants. Such an arrangement is shown below. By reference to this chart, the identification of any given plant is made easier and certain and its relationships to other plant families more clearly understood.

Araceae

Empleaceae

Ceratophyllaceae

Berberidaceae

Aristolochiaceae

Betulaceae

Corylaceae

Urticaceae

Salicaceae

Rosaceae

Leguminosae

Crassulaceae

Saxifragaceae

Droseraceae

Hydrangeaceae

Grossulariaceae

Hypericaceae

Violaceae

Alsineae

Geraniaceae

Malvaceae

Callitrichaceae

Aceraceae

Hippocastaneae

Anacardiaceae

Rhamnaceae

Umbelliferae

Rubiaceae

Caprifoliaceae

Valerianaceae

Compositae

Cruciferae

Papaveraceae

Fumariaceae

Capparidaceae

Cruciferae

Chenopodiaceae

Amarantaceae

Lythraceae

Onagraceae

Halorrhagidaceae

Loasaceae

Linaceae

Balsamineae

Portulaceae

Primulaceae

Plantaginaceae

Orobanchaceae

Verbenaceae

Labiatae

Convolvulaceae

Boraginaceae

Solanaceae

Scrophulariaceae

Lentibulariaceae

NOMENCLATURE:

By general agreement of botanists plants are admitted to have only one true name. This name is written in Latin and is composed of two or sometimes three words. The first, a proper noun written with a capital, is the generic name. The second capitalized only in certain cases, is usually a modifying adjective which is known as the specific name. For example, referring again to the blackberry, raspberry and thimbleberry, we find that the first is called Rubus macropetalus, the second Rubus idaeus and the third Rubus parviflorus. In this case the generic name common to all is Rubus, the specific names respectively being macropetalus, idaeus, and parviflorus.

The third, likewise usually a modifying adjective, is known as the varietal or subspecific name. This appears only when it has been deemed expedient from the taxonomic standpoint to recognize units smaller than species. By variety or subspecies is usually meant a variant portion of the species which is morphologically recognizable and generally occupying a geographical range different from that of the "typical". It must be remembered that the "typical" form or subspecies is a nomenclatorial concept, derived from rules of nomenclature and is not always typical in the sense of being the norm.

Although a plant name always specifies the genus to which the plant belongs, the family is not usually indicated by it. Family names usually are formed from the root of a well known genus belonging to the family in question to which is usually added -aceae, as in Rosaceae, the rose (Rosa) family.

It frequently happens that, because of differences of opinion or incomplete information, two or more names are applied to the same species. In such cases the oldest name is the one properly employed. Because of other references it is sometimes desirable to cite in parentheses the synonyms which are or have been employed by other authors. In the present paper these appear at the end of the species description.

THE USE OF KEYS:

Each family with more than one genus, each genus with more than one species and the entire system of families herein have been provided with keys to assist in the determination of the name and position of any given plant. Such keys are devices to assist, and because of the innate variation of living organisms are often faulty or incompletely satisfactory. Their fullest usefulness is attained only with experience. In the present keys we have sought insofar as possible to use characters which will permit determination of the plant whether in flower or fruit and often, from foliage alone.

It will be observed that the keys consist of a series of alternatives, each alternative consisting of a pair of contrasted characters. Rarely are there three alternatives to choose from. For satisfactory results it is necessary to study the plant critically and completely before consulting the key. After this the first pair of contrasted characters is approached.

Suppose, for example, that the plant in question, of which it is desired to learn the specific name, is a species of Rubus. Its stems are erect and covered with straight prickles, its leaves are compound, with 3-5 leaflets, its petals are white and the calyx is notably glandular. By reference to the key to Rubus (p. ___) it will be seen that the first alternative presented there refers to the leaf habit. Inasmuch as the leaves of the plant being determined are compound, we necessarily choose the second alternative which requires this condition. Passing to the next pair of alternatives, to the next fork in this tortuous path, it is again necessary to choose the second alternative which requires a plant which is erect and armed with prickles. Inasmuch as the petals are white, we choose again the second alternative of the next pair and pass to the last pair. Our plant must therefore be either R. idaeus or R. leucodermis. We must now choose between the last alternatives, and are constrained by the straight prickles and glandular hairs of the calyx to halt at 5. R. idaeus. Turning to the description of that species, we compare our plant with it and find that it compares favorably, that is, fits within the range of variation described. Thus we conclude that the plant in question is that species.

Sometimes the key may be inadequate or ~~equivocal~~, or it may be applicable only to the plants in flower, and the specimen we have at hand is in fruit. It is still possible to arrive at a conclusion by a process of elimination. For example, let us suppose that the plant in question is an Eriogonum in which only some weathered fruits are avail-

able, the flowers being long past. Inasmuch as there are several glomerules and since the plants are about 30 cm. tall, the second pair of alternatives in the key (p. ___) is readily reached but one is unable to answer either of these satisfactorily. An assumption is therefore made that the plant belongs in the first group. On examination of the descriptions, however, it is found that the flowering scapes of those species are naked, but that this plant has a whorl of leaves near the middle of the scape. Passing to the next alternative group one finds that E. heracleoides satisfies this requirement and also that the plant corresponds to the description of that species. Thus by a series of assumptions and a process of elimination, the keys may be made useful in many cases where full data are not at hand.

VARIATION:

The effect of the environment may be seen in various ways. The physical composition of the soil and its consequent water-retaining power may greatly affect the stature of annual plants. The effect of snow-lodgement may affect the habit of shrubs. The effect of wind on exposed ridges may affect the stature and habit of shrubs and trees. Individuals growing in shade at the edge of the forest may have much larger and thinner leaves than those growing nearby in the open. Such a list of ecologic and environmental differences or states might be extended much further. To weigh correctly the value of such variations requires careful observations and field experience. It is natural that the beginner is prone to overestimate variations which with wider experience are found to be wholly environmental.

~~Class 2~~ C. ANGIOSPERMS.

H Ovules borne in a closed sac which is termed the pistil, with which upon maturity becomes the fruit, enclosing the seed or seeds; cotyledons 1 or 2. Plants ~~having~~ true flowers which may consist either of stamens or of pistils or of both, these usually enveloped by ~~one or more~~ a series of modified leaves termed the perianth which in turn may be differentiated into two series, termed ~~respectively~~ which are the calyx and corolla.

Each individual is possessed of a given inheritance which will cause it to develop in a certain way. It does not develop to maturity in a vacuum, however, but in response to a given environment. Individuals with identical heritage may accordingly be modified within certain limits by differences in environment, which thus mask in greater or less degree genetic similarity or identity.

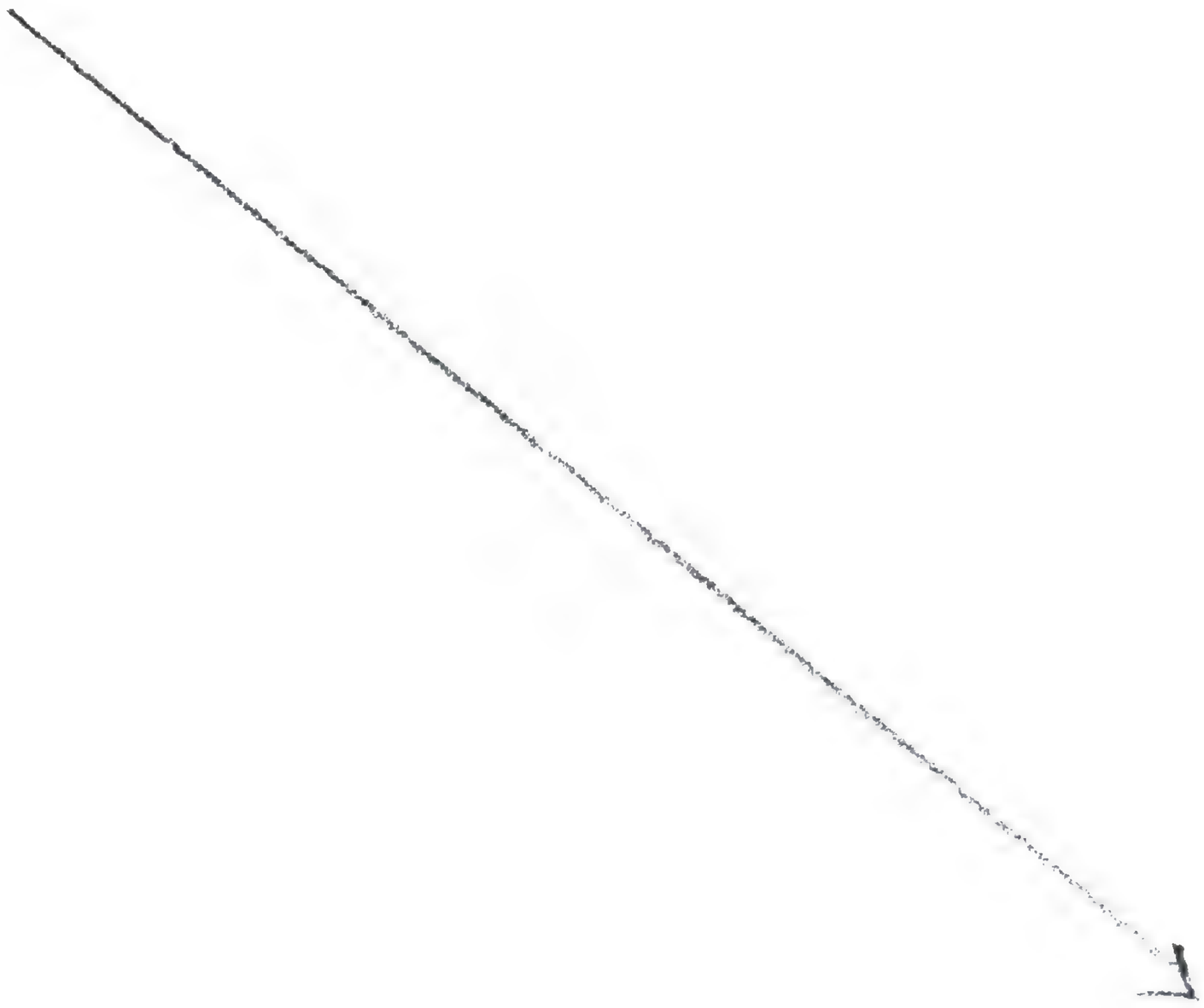
At the same time a given population may be quite diverse genetically, that is, the individuals may have a diverse heritage and may differ morphologically. Plant species are often composites of several small races variously differentiated. For example, one may sometimes find, in a field of blue lupines, a single white flowered plant. Or he may find in certain Gilias, a patch here which is quite white, a patch there which is uniformly pink. The difference is striking, and the beginner may be misled by it. Or, when single individuals of variant races are compared, the differences may seem of sufficient weight to justify specific segregation.

The effect of racial intermixture is more difficult to judge. When single individuals of variant races are compared, the differences may seem of sufficient value to justify specific recognition. However, when whole populations are studied or several races are compared, such differences often disappear and the species is found to consist of several forms which in nature merge to form a unit. It is accordingly desirable to study not a single individual but several individuals at the same time and, when convenient, from several places, bearing in mind, always, that living forms are plastic changing things.

GENERAL KEY TO THE FAMILIES

A. FERNS AND FERN ALLIES

Stems usually underground or creeping. Leaves commonly tufted and compound. Flowers and seeds none, reproduction being effected by minute spores which are borne in clustered sacs generally on the lower surface of the leaves. Some are aquatic and may be completely submerged, some are moss-like.



Rush-like or bushy plumose plants with hollow jointed stems, the leaves being reduced to short cylindrical or funnel-shaped sheaths covering the nodes, with or without whorls of jointed slender branches — Equisetaceae (p. —)

Plants not rush-like nor bushy plumose with jointed stems

Small aquatic plants either wholly submerged or amphibious as when growing in mud previously covered with water

Leaves in a basal tuft, grass-like or rush-like, usually submerged, the sporangia in cavities at the base of the leaves — Isoetaceae (p. —)

Leaf-blades usually floating, on long petioles resembling a 4-leaved clover — Marsileaceae (p. —)

Terrestrial plants (often growing in moist places)

Moss-like plants with small usually awl-shaped leaves which overlap upon the trailing or decumbent stems

Small mat-forming plants rarely 10 cm. tall, or if trailing, the leaves oval; spores of two sizes, produced in separate sporangia; leaves 2-3 mm. long — Selaginellaceae (p. —)

Creeping or sometimes erect plants but the erect branches usually more than 10 cm. tall; leaves mostly 4-7 mm. long; spores all of one size — Lycopodiaceae (p. —)

Erect plants with broad, pinnate leaves

Sporangia globose, sessile, about 1 mm. broad, opening by two valves, arranged along the margins of modified leaves which may be either linear and simple, thus forming a very slender spike, or may be pinnate, thus forming a cluster resembling a cluster of minute grapes — Ophioglossaceae (p. —)

Sporangia minute, shaped like a watch, stalked, assembled into clusters on the lower sides of the leaves, either naked or covered by a thin membrane or by the curled leaf margin (True ferns) — Polypodiaceae (p. —)

I. Dicotyledons

Centers { Leaves mostly net-veined; flower parts usually in 4's or 5's, less often in 3's or 6's; cotyledons 2; trees, shrubs or herbs, sometimes aquatic, mostly of dry land.

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0 1a. Petals none, the flower consisting in some cases of stamens or pistils only, the perianth being wholly suppressed or represented by a small gland or glands, most often consisting of a series of green segments which may represent both petals and sepals as usually understood and may in some cases be white or pink or yellow and petal-like, or which may represent a true calyx, the corolla having been suppressed in particular cases. 4

2 Plants without chlorophyll, parasitic upon the branches 6 of conifers, usually not very conspicuous. Loranthaceae (p. —)

2 Plants with chlorophyll, rarely parasitic but if so, 6 appearing to rise from the earth.

4 2a. Trees and shrubs

6 Leaves opposite

8 Leaves entire, scurfy with fringed hairs Elaeagnaceae (p. —)

8 Leaves palmately 5-7 lobed, glabrous. Aceraceae (p. —)

6 Leaves alternate

8 Leaves palmately lobed, the stems spinose Araliaceae (p. —)

8 Leaves simple and toothed, not lobed,

12 the stems smooth×

10 Flowers in small axillary clusters, the perianth yellowish-green, 4-5-
14 lobed; fruit a berry× — Rhamnus (p. —

10 Flowers of two kinds, without proper perianths, arranged in spikes which may be erect or tassel-like
14 and pendulous, the stamens and ovaries borne on small scales×

12 Fruit a catkin of small flask-shaped capsules which split into 2 or 3 valves at maturity; seeds tipped with a tuft of
16 hairs by which they are disseminated×; leaves generally 3-4 times as long as broad — Salicaceae (p.

12 Fruit not as described×; leaves usually less
16 than twice as long as broad

14 Fruit an edible nut closely invested by a foliaceous
18 involucre; shrubs× — Corylaceae (p.

14 Fruit conelike, the scales either deciduous or persistent, the nutlets which they enclose
18 disseminated by a thin scarious wing; mostly trees or treelike× — Betulaceae (p.

4 2b. Herbs.

6 Plants growing entirely in water, or in some cases growing in swampy places which may later in the year become dry; leaves linear
10 or divided into linear or hair-like segments, opposite or more commonly in whorls×

8 Leaves entire or pinnately dissected×

10 Leaves entire and in opposite pairs — Callitrichaceae

10 Leaves pinnately dissected or if entire,
14 in whorls of several at each node× — Haloragidaceae

8 Leaves 3 times forked, the divisions
12 hairlike, stiffish, roughened by minute spines× — Ceratophyllacea

6 Plants not as described, frequently of muddy
10 places, but not aquatic×

8 3a. Leaves opposite, or sometimes in whorls of
12 4-8×

10 Leaves in opposite pairs.

12 Sepals 5; stamens mostly 10. — Caryophyllaceae (p. —)

12 Sepals 4 or wanting; stamens never 10.
16

14 Leaves sharply toothed; the stems, at least, provided with stinging hairs; sepals 4. — Urticaceae (p. —)
18

14 Leaves entire or minutely toothed, smooth and glabrous; sepals none (what may be taken for sepals are 4, or sometimes 5, glands which may have narrow white margins or two horn-like appendages); ovary 3-celled, soon elevated upon a stalk. — Euphorbiaceae (p. —)
18

10 Leaves in whorls of 4-8.

12 Ovary superior; stamens 5 — Aizoaceae (p. —)

12 Ovary inferior; stamens 4 (rarely 3) — Rubiaceae (p. —)

8 5b. Leaves prevailingly alternate, some or all basal in many cases.
12

10 Ovary 3-chambered with 1 ovule in each chamber, elevated upon a stalk, projecting at maturity from a cup-shaped involucre, the 4 glands of which are sepal-like with prong-like appendages; uppermost leaves whorled. — Euphorbiaceae (p. —)
14

10 Plants not as described.

12 Leaves ternately compound; flowers dioecious, the staminate consisting of several purple anthers pendulous upon hair-like filaments, the pistillate consisting of ~~several~~ erect pistils with attenuate styles, forming ribbed achenes at maturity — Thalictrum (p. —)
16 (a globose cluster of)

12 Plants not as described.

14 Pistils more than one in each flower.
18

16 Leaves kidney-shaped, deeply palmately 6-9-lobed to the middle; stamens enlarged at the tips, the anthers tiny — Trautvetteria (p. —)
20

16 Leaves round to oval, merely toothed, flowers solitary on a naked peduncle, sepals petal-like — Caltha (p. —)
20

~~General Key~~

~~Class 1~~ B. GYMNOSPERMS.

Ovules borne upon the surface of scales which are usually arranged about a central axis, forming ~~thus~~ a cone, ~~at maturity~~ at maturity, which in Juniperus becomes fleshy rather than woody, completely hiding the seeds; in Taxus a bright red cherry-like structure is formed; in neither case are the seeds contained within a receptacle; leaves needle-like, except, however, in Juniperus and Thuja where they are minute and scale-like, overlapping so that a branchlet resembles braided cord; cotyledons 2-several; plants without true flowers.

Ovulate strobili of a solitary ovule, becoming a bony stone, at maturity inclosed or subtended by a fleshy integument

Taxaceae (p. —)

Ovulate strobili of several ovule-bearing woody cone scales (coalescent and berry-like in Juniperus), the ovules becoming winged or wingless seeds

Leaves and cone scales spirally arranged, the leaves in ours needle-like, 1-25 cm. long; cotyledons several

Pinaceae (p. —)

6 Leaves and cone scales cyclically arranged in 2's and 3's, the leaves in ours small and scale-like, closely appressed and covering the branchlets; cotyledons 2 or several

Cupressaceae (p. —)

26 Plants not as described

28 Stamens 6-9 (frequently 5 in Polygonum); perianth segments white, pink or yellow, or if green, in two dissimilar series — Polygonaceae (p.

28 Stamens 1-5; perianth segments green, in a single series (a single sepal in Corispermum and Monolepis)

30 Flowers subtended and enlosed by chaffy scarious usually prickly bracts; perianth scarious — Amaranthaceae (p.

30 Flowers not so subtended, the perianth green and rather fleshy — Chenopodiaceae (p.

1b. Petals present, the perianth consisting of a clearly defined outer whorl, the calyx (its subdivisions called sepals) and the corolla (its subdivisions called petals). (an inner whorl) The former is prevailingly green and herbaceous, the latter colored and of a different texture. The members of each whorl may be entirely distinct from each other and from the contrasting whorl, or may be more or less united with each other, with the contrasting whorl or with the ovary and stamens. In some genera of Umbelliferae the sepals are wanting, or minute

2 4a. Petals distinct, not united (or if so, only at the very base); ~~in this case~~ one can usually be detached without disturbing the others

4 5a. Aquatic plants, wholly or partly submerged or floating, sometimes growing in swampy ground which may later become dry

6 Leaves oval, 6-8 cm. or 20-40 cm. long, very smooth, leathery and — Nymphaeaceae (p.—)

(simple and) 6 Leaves linear, 6-10 in a whorl at each node — Haloragidaceae (p. (h) (See 3rd. Categ.)

6 Leaves dissected into linear or hair-like 10 segments (See also Utricularia)

8 Leaves pinnately dissected into 15-20 12 linear segments — Haloragidaceae p.

8 Leaves several times 3-(or less often 12 2-) forked — Ranunculaceae (p.

4 5b Terrestrial plants, often growing in swampy places, but if so, not as described; (the family Compositae in which several or numerous flowers are → assembled into a single flower-like head may be sought here improperly.)

6 6a Stamens more than 10, often numerous.

8 Stamens united into a column around the styles and to the base of the 12 corolla which covers the ovary. Malvaceae (p. —)

8 Stamens sometimes united into small groups but not forming a column around the styles nor hiding the 12 ovary.

10 Calyx free from the ovary or ovaries, 14 ie. the latter superior.

12 Pistils more than one in each 16 flower.

14 Stamens attached to the receptacle at the base of the ovaries; 18 always herbs Ranunculaceae (p.

14 Stamens seated either upon the margins or sides of a cup-like calyx tube or in usually 3 series upon a thickened area at 18 its base, not strictly seated upon the receptacle proper; often shrubs Rosaceae (p. —)

12 Pistils one in each flower.

14 Fruit a capsule opening by a line around the equator, the top thus 18 falling away; small fleshy herbs with simple leaves. Portulacaceae (p.

14 Fruit a berry or drupe.

16 Shrubs or trees; leaves simple, 20 alternate. Rosaceae (p. —)

16 Herbs 60-90 cm. tall; leaves 20 compound. Ranunculaceae (p.

10 Calyx partly or wholly adherent to the 14 ovary, the latter therefore inferior

12 Sepals 2 Portulacaceae p.

12 Sepals 4 or 5

14 Leaves opposite.

16 Leaves merely toothed or entire — Hydrangeaceae (p.—)

16 Leaves palmately 5-7-lobed — Aceraceae (p.—)

14 Leaves alternate

16 Shrubs; petals white; fruits 20 fleshy — Rosaceae (p.—)

(which adhere to clothing) 16 Herbs with rough leaves; petals 20 yellow; fruit a capsule — Loasaceae (p.—)

6 6b. Stamens 10 or fewer, not more than twice as many 10 as petals.

8 Stamens opposite the petals.

10 Sepals 2; herbs

12 Petals 4 in two dissimilar pairs; 16 one or both of the outer petals saccate or spurred at the base — Fumariaceae (p.

12 Petals 5, all similar — Portulacaceae (p.

10 Sepals 5; inconspicuous herbs with 14 greenish flowers (see 3rd categ.) — Mitella (p.—)

10 Sepals 4-6; shrubs

12 Leaves more or less holly-like on the 16 margins; shrubs less than .5 m. tall — Berberidaceae (p.

12 Leaves toothed but not holly-like; shrubs 16 or small trees 1-3 m. tall or more. — Rhamnaceae (p.

8 Stamens not opposite the petals, usually 12 alternate, sometimes both alternate and opposite.

10 7a. Trees or shrubs.

12 Leaves opposite.

14 Leaves palmately 5-7-lobed.

14 Leaves merely toothed or entire — Aceraceae (p.—)

16 Flowers in terminal clusters, 20 white, showy — Cornaceae (p.

16 Flowers axillary, purple, inconspicuous — Celastraceae (p.

12 Leaves alternate.

14 Leaves compound, trifoliolate or with 16 numerous leaflets — Anacardiaceae

14 Leaves simple.

16 Stems and leaves smooth, the
20 latter merely toothed — Rhamnaceae (p.—)

16 Stems densely spinose, the
20 leaves bearing spines beneath — Araliaceae (p.—)

10 7b. Herbs

12 8a. Ovaries more than 1 in each flower.

14 Ovaries several or numerous,
18 forming achenes at maturity;
ovules solitary in each ovary.

16 Stamens attached at the base of
20 the ovaries — Ranunculaceae (p.—)

16 Stamens inserted upon a cup
20 like calyx tube. — Rosaceae (p.—)

14 Ovaries either 2 or 5, forming
18 erect follicles in fruit; ovules
several in each ovary.

16 Ovaries and follicles 2

18 Petals joined at the base;
22 filaments united into a tube
which bears a circlet of five
hooded appendages each bearing a curved prong. — Asclepiadaceae (p.—)

18 Petals distinct at the base;
22 stamens simple — Saxifragaceae (p.—)

16 Ovaries and follicles 5 — Crassulaceae (p.—)

12 8b. Ovaries solitary in each flower.

14 9a. Leaves opposite.

16 Leaves palmately or pinnately
lobed; ovary 5-chambered, with
20 5 styles, splitting at maturity into 5 1-seeded fruits
which split from the erect central column. — Geraniaceae (p.—)

16 Leaves entire or merely toothed;
20 ovary and fruit not as described.

18 Small herbs with leaves less
22 than 1 cm. long.

20 Ovary 2-chambered, 2-beaked — Saxifraga (p.—)

20 Ovary 1-chambered, with
24 usually 3 styles — Caryophyllaceae (p.—)

18 Herbs with leaves more than 221 cm. long

20 Petals either 2 or 4

22 Stamens 4 — Lythraceae (p. —)

22 Stamens 8 (2 in Circaea) — Onagraceae (p. —)

20 Petals 5, sometimes appearing as 10 due to a deep incision in each

22 Flowers yellow; stamens grouped in small bundles — Hypericaceae (p. —)

22 Flowers white or red, never yellow; stamens distinct — Caryophyllaceae (p.

14 96. Leaves alternate or basal, not 18 opposite.

16 Flowers irregular, the petals partly or all dissimilar, one or more often produced into a sac or spur.

18 Leaves compound, mostly pinnate (palmate in Lupinus) fruit a 1-chambered pod. — Leguminosae (p. —)

18 Leaves simple; fruit a 22 capsule.

20 Sepals appearing as though two, these rotund and often yellowish, the third petal-like, formed into a pendant sac which is 8-10 mm. broad in the throat. — Balsaminaceae (p. —)

20 Sepals 5, all green, lanceolate; petals 5, the innermost produced backwards into a knob-like sac or slender spur. — Violaceae (p. —)

16 Flowers regular, the petals not markedly dissimilar in size or 20 shape.

18 Plants without chlorophyll, either waxy-white or flesh-colored, turning brown or black in age — Monotropa (p. —)

18 Green plants

2010a. Stamens 6; petals 4

22 Stamens equal in length; ovary and pod 1-chambered; leaves palmately trifoliolate x — Capparidaceae (p. —)

22 Stamens in two unequal series, the taller 4, the shorter 2 in number; pod 2-chambered; leaves not palmately trifoliolate x — Cruciferae (p. —)

20 10b Stamens 4 or 8; petals 24 4 (see 3rd categ.) — Onagraceae (p. —)

20 10c Stamens 5 or 10; 24 petals 5

22 Flowers and fruit arranged in simple or compound terminal umbels; ovary 2-chambered, at maturity separating into halves which usually remain attached to and pendant from a slender stalk which rises between them; leaves compound except in Zizia; flowers and fruit in dense heads in Eryngium — Umbelliferae (p. —)

22 Plants not as described; leaves simple except in Aralia.

24 Leaf solitary, basal, 28 compound x — Aralia (p. —)

24 Leaves several or numerous, simple, sometimes scalelike

26 Anthers opening by terminal
30 pores

28 Prostrate creeping plants
32 with leaves 4-8 mm. long;
ovary inferior; fruit a
berry — Oxycoccus (p.—)

28 Erect or ascending plants
32 with larger leaves, ~~rarely~~ sometimes
wanting or scale-like;
ovary superior; fruit a
capsule. — Pyrolaceae (p.—)

26 Anthers opening by longitud-
30 inal slits

28 Shrubs; ovary inferior;
32 fruit a berry — Grossulariaceae (p.—)

28 Herbs; ovary mostly super-
32 ior; fruit a capsule

30 Capsule globose, incom-
34 pletely 10-chambered,
splitting into 10 valves;
petals blue; leaves linear,
evenly distributed along
the stems. — Linaceae (p.—)

30 Plants not as described,
34 petals white, pink or
violaceous, sometimes
greenish; leaves not
linear, mostly basal;
capsule 2-3-valved (rare-
ly 5). —

32 Margins and upper sur-
36 faces of leaves fringed
with red glandular
bristles 2-5 mm. long. — Droseraceae (p.—)

32 Leaves sometimes glandu-
36 lar but not as described — Saxifragaceae (p.—)

2 4b. Petals united at least at the base, most often forming a bell-shaped or cylindrical tube which is variously lobed at the apex; the corolla thus described is deciduous as a whole, usually bearing with it the stamens

4 11a. Stamens more numerous than the lobes of the
8 corolla.

6 Stamens 10 or less

8 Plants without chlorophyll, flesh-colored,
12 scaly, stamens 10; corolla globose — Pterospora (p.—)

8 Green plants with proper leaves

10 Stamens mostly 10, sometimes 8, opening
14 by terminal pores; shrubs, sometimes small and prostrate; flowers regular, urn-shaped or saucer-shaped. Ericaceae (p.—

10 Stamens not opening by terminal pores;
14 herbs with irregular flowers

12 Stamens 10 Leguminosae (p.—

12 Stamens 6 Fumariaceae (p.—

6 Stamens numerous, united into a column
10 surrounding the styles and united to the base of the corolla which covers the ovary Malvaceae (p.—

4 11b. Stamens as many as the corolla lobes or fewer

6 Stamens opposite the corolla lobes Primulaceae (p.—

6 Stamens alternate with the corolla lobes or
10 fewer.

8 Aquatic herbs with finely dissected
12 leaves bearing small bladders which serve as floats; flowers solitary on naked peduncles, strongly irregular, yellow. Utricularia (p.—

8 Plants not as described, rarely aquatic.

10 Ovaries two in each flower, (with a single style and stigma), becoming separate
14 follicles in fruit, the seeds bearing a silky tuft of hairs; juice milky.

12 Corolla bell-shaped, the stamens
16 attached to the base of the corolla. Apocynaceae (p.—

12 Corolla 5-parted, the filaments
16 united into a tube which encloses the ovaries, the tube bearing a circlet of 5 hooded appendages, each with an incurved prong. Asclepiadaceae (p.

10 Ovary one in each flower

12 Plants without chlorophyll or
16 proper leaves, flesh-colored, parasitic on roots of other plants (Cuscuta arvensis, a leafless yellow twining parasite on alfalfa with small scarious flowers in globose clusters may occur in the warmer dryer ~~portions~~ valleys) Orobanchaceae (p.

12 Plants with chlorophyll and proper
16 leaves.

14 12a Ovary divided into 4 erect lobes, the style arising from their midst, the lobes falling apart at maturity, forming 4 nutlets.

16 Stamens 5; corolla regular, equally 5-lobed — Boraginaceae (p.—)

16 Stamens 4 or 2; corolla irregular, commonly 2-lipped, or if nearly regular, with 4 lobes. — Labiatae (p.—)

14 12b Ovary not lobed.

16 13a. Ovary superior, free from the calyx.

18 14a. Stamens 4 (sometimes a fifth sterile or rudimentary stamen may be present) or 2.

20 Leaves alternate or basal

22 Corolla equally 4-lobed, thin and scarious; capsule opening by a split around the equator — Plantaginaceae (p.—)

22 Corolla strongly irregular, 2-lipped, the upper produced into a beak, the lower lip often very small, or if nearly regular (Synthyris) blue, with two stamens. — Scrophulariaceae (p.—)

20 Leaves opposite or in whorls of 3

22 Corolla strongly irregular, 2-lipped, or if nearly regular, blue with two stamens; ovary 2-chambered. — Scrophulariaceae (p.—)

22 Corolla nearly or quite regular, not at all 2-lipped.

24 Ovary 4-chambered, splitting at maturity into 4 divisions; leaves hairy — Verbenaceae (p.

24 Ovary 1-chambered forming a capsule; leaves glabrous — Gentianaceae p.

18 14b. Stamens 5

20 Ovary 1-chambered

22 Leaves opposite, entire — Gentianaceae (p.

22 Leaves alternate or basal, entire only in Hesperochiron

24 Leaves trifoliolate, basal, very smooth — Menyanthaceae

24 Leaves basal or alternate, not trifoliolate, mostly hairy, entire if glabrous — Hydrophyllaceae

20 Ovary 2-chambered; leaves alternate

22 Corolla 5-lobed
24 Stamens glabrous; fruit a berry — Solanaceae (p.

24 At least 2 stamens densely hairy; fruit a capsule — Verbascum (p.

22 Corolla funnel-shaped, with 5 longitudinal folds, the margin entire — Convolvulaceae

20 Ovary 3-chambered, with 3-branched styles; leaves alternate or opposite — Polemoniaceae

16 13b. Ovary inferior, adnate to the calyx tube, the corolla and sepals appearing as though seated upon it

18 Shrubs or small trees or one a climbing vine-like shrub; leaves opposite, — Caprifoliaceae

18 Herbs

20 15a. Leaves opposite or in whorls, stamens 4 or 3, rarely 2,

22 Prostrate creeping herb with ovate leaves, the flowers in pairs on erect slender peduncles — Linnaea (p.

22 Herbs but not as described;
26 if prostrate, the leaves in whorls of 4-8; calyx lobes wanting or practically so,

24 Stout stiff herbs with
28 spinose leaves united at the base, thus forming a cup through which the stem passes; flowers in spinose heads, Dipsaceae (p.—)

24 Slender herbs, not as described

26 Leaves in whorls of 4-8,
30 rarely opposite, in which case the flowers are solitary in the axils; corolla rotate, 3 or 4 parted, Rubiaceae (p.—)

26 Leaves opposite, not
30 whorled, flowers in terminal clusters, corolla tubular, the tube having a small sac on one side at the base Valerianaceae (p.—)

20 15b Leaves prevailingly alternate,
24 infrequently opposite, stamens 5, sometimes wanting in unisexual flowers,

22 Flowers axillary, few; sepals
26 present

24 Stamens united into a tube
28 which surrounds the style, Lobeliaceae (p.—)

24 Stamens not united Campanulaceae (p.—)

22 Flowers assembled in heads upon a common receptacle,
26 which is subtended by one or more series of variously modified bracts, the whole frequently resembling a single flower rather than an inflorescence; proper sepals wanting, forming a pappus of bristles, hairs or chaff, or none Compositae (p.—)

II. Monocotyledons

Leaves mostly with parallel veins; flower parts mostly in 3's, the perianth proper often wanting, however; cotyledon 1; herbaceous plants, often aquatic, commonly of wet situations.

---

0 1a. Minute floating plants forming a green coat on the surface of quiet water, consisting of oval, disc-shaped bodies, 2-5 mm. long, to the underside of which are attached one or more rootlets. 4 — Lemnaceae (p. —)

0 1b. Plants rooted in earth but often growing in water, sometimes wholly submerged. 4

2 2a. Perianth either none or consisting of bristles or of membranous or chaffy scales, not at all petal-like and showy, but inconspicous; rush-like or grass-like plants, commonly inhabitants of bogs or growing in water; flowers commonly in dense spikes or globose heads.

6

4 Small tufted plants with linear leaves 2 cm. long or less, wholly submerged in water, the flower minute, inconspicuous, axillary, consisting of a single stamen or a single pistil

8

either

Naiadaceae (p.—

4 Plants not as described above

6 Rush-like plants as tall as a man, with linear leaves and flowers borne in compact terminal cylindrical spikes 12-15 cm. long, the staminate spike immediately above the pistillate spike; perianth of hairlike bristles.

10

Typhaceae (p.—)

6 Plants not as described above

8 Partly submerged, often partly floating, rush-like plants with flowers borne in several axillary spherical heads; perianth of chaffy scales

12

Sparganiaceae (p.

8 Plants not as described above

10 Plants rooting in bottoms of streams, lakes or pools, the stems mostly submerged, the upper leaves sometimes oval and flat, floating on the surface, sometimes all linear and submerged; flowers either in dense spikes the diameter of a small lead pencil or less, one to several centimeters long, elevated above the surface of the water or else in small axillary clusters.

14

Potamogetonaceae

described

10 Plants not as above; erect terrestrial plants growing often in bogs or marshes, rarely in water.

14

12 Plants with large fleshy leaves 20-100 cm. long; flowers borne in a compact cylindrical spike which is

16

16 surrounded by a yellowish leafy envelope; the whole resembling a calla lily, appearing before the leaves. Araceae

12 Plants not as above

14 Flowers each consisting of usually 3 stamens and 1 pistil, without a proper perianth, borne in the axils of membranous greenish or brown bracts which become chaffy on drying (grasses and sedges)

16 Each flower borne in the axil of a single bract, arranged in compact clusters; leaves 3-ranked; stems solid; sedges Cyperaceae (p. —)

16 Each flower enclosed between two unequal bracts, arranged in compact clusters; leaves 2-ranked; stems hollow; grasses Gramineae (p. —)

14 Flowers consisting of 6 (very rarely 3) stamens and one, three or six pistils, surrounded by 6 greenish or brown membranous similar perianth segments, arranged in two series.

16 Carpels completely joined, opening by loculicidal valves at maturity but not splitting apart. Juncaceae (p. —)

16 Carpels nearly free in flower or splitting apart at maturity if joined. Scheuchzeriaceae (p.

22b Perianth petal-like, white or colored, rarely greenish, conspicuous, the segments either all similar or in 2 unlike series, or all more or less dissimilar.

4 Submerged aquatics with lanceolate leaves in whorls of 3, 1-1.5 cm. long, 1-1.5 mm. wide Hydrocharitaceae

4 Terrestrial plants

6 Ovaries numerous in each flower, distinct, either in globose heads or in a ring upon

10 < a flat receptacle, forming achenes at maturity — Alismataceae (p.)

6 Ovary one in each flower, forming either a
10 berry or a capsule at maturity

8 Ovary superior; perianth segments mostly alike
12 < and petaloid; sometimes the outer series green, rarely both; stamens 6, rarely 4

10 Flowers in umbels — Amaryllidaceae (p.)

10 Flowers in racemes, spikes or solitary,
14 not in umbels

12 Leaves 3, broad and net-veined, borne in a
16 < whorl at the summit of the stem; flowers solitary in the whorl — Trilliaceae (p.)

12 Leaves and flowers not as described, the
16 < former basal or alternate upon the stem, the latter in racemes, panicles or spikes, or solitary in the axils — Liliaceae (p.)

8 Ovary inferior; perianth segments in 2 unlike
12 series or dissimilar

10 Flowers regular; stamens 3 — Iridaceae (p.)

10 Flowers irregular; stamens 1 (or 2) variously
14 < joined with the style to form an erect column — Orchidaceae (P.)

The description of the genus arrived at should be carefully studied and the plant in question compared.

A LEAF KEY TO THE COMMON WOODY PLANTS

0 1a. Plants evergreen, bearing leaves in the form of needles or 4 small scales; trees or tree-like shrubs("conifers").

2 2a. Plants bearing distinct needles 1 cm. long or more.

4 Needles in bundles or thick clusters

6 Needles 5-15 cm. long, in bundles of
10 5, 3 or 2 — Pinus (p.—)

6 Needles 2-3 cm. long, in tuft-like clusters
10 on stubby, peg-like side branches — Larix (p.—)

4 Needles in circlets of three round the stem,
8 curving upwards, white inside, very sharp;
plant a low, dense sprawling shrub (see 3rd. categ.) — Juniperus (p.—

4 Needles attached singly along the branchlets

6 Needles four-angled and squarish in cross-
section, very sharp, stiffish and prickery;
10 young bark very rough, mature bark flaking,
not deeply fissured — Picea (p.—)

6 Needles flattened in cross-section with a
10 distinct groove down the middle

8 Needles 1-2 cm. long, the base of the
needle not abruptly attached to the
12 branchlet but running down along it
for 2-4 mm. or more

10 Needles very sharp, dull green beneath;
14 plant a sprawling tree-like shrub, rarely a small tree — Taxus (p.)

10 Needles blunt, whitened at least
beneath; plant an erect tree, the trunk
14 becoming several feet in diameter — Tsuga (p.—)

8 Needles 2.5-5 cm. long, the base of the
needle abruptly attached and not running
down along the branchlet, hence when the
12 needle falls it leaves merely a circular
scar

10 Needles generally blunt and often
notched; when examined in cross-
section with a lens two oil canals
can be seen, one on each side of the
14 mid-rib; branchlets horizontal, not
drooping — Abies (p.—)

10 Needles rather pointed, never notched,
no oil tubes apparent, branchlets
14 markedly drooping, very soft — Pseudotsuga (p.

2 2b. Plants with scale-like "needles" which are pressed closely against the branchlets, covering them and giving a braided appearance or resembling fishing cord.

4 Branchlets in flat sprays, green, scales about 4 mm. long; mature bark stringy and fibrous, light brown — Thuja (p. —)

4 Branchlets like fishing cord, 2 mm. in diameter, including the scales, scales hardly more than 2 mm. long, pale green; a low dense tree, smoky pale in the distance, bark flaking irregularly, purplish grey — Juniperus (p. —)

0 1b. Plants rarely evergreen, bearing leaves (1) cm. or more broad; mostly shrubs.

2 3a. Leaves compound, that is, made up of several leaflets. Our compound leaves may be told by the fact that a leaflet and not a bud terminates the apparent stem.

4 Leaves with three (or rarely five) leaflets only

6 Stems armed with prickles — Rubus (p. —)

6 Stems smooth — Rhus (p. —)

4 Leaves with 5-21 leaflets

6 Stems prickly — Rosa (p. —)

6 Stems not prickly

8 Shrubs usually 2-several feet tall; leaves not prickly

10 Leaves and leaflets both opposite — Sambucus (p. —)

10 Leaves alternate but leaflets opposite

12 Leaves 7-13 foliolate; buds glabrate — Sorbus (p. —)

12 Leaves 10-21 foliolate; buds white wooly — Rhus (p. —)

8 Shrub rarely more than a foot tall; leaves spiny on the margin — Mahonia (p. —)

2 3b. Leaves simple; may be told by the presence of a bud in the angle at the base of the stalk. (leaf)

4 4a. Leaves opposite (most of the leaflets of our compound leaves are opposite, but these may be told by the terminal odd leaflet)

6 Leaves 25 mm. long or less, very leathery — Pachystima (p.—)

6 Leaves commonly 2-15 cm. long

8 Leaves lobed, the lobes radiating
12 like fingers from the palm

10 Leaves 5-lobed — Acer (p.—)

10 Leaves 3-lobed — Viburnum (p.—)

8 Leaves not lobed

10 Branches bronze-colored with a
14 metallic scurf — Shepherdia (p.—)

10 Branches green, tan or reddish,
14 smooth or with a light fuzz but not as described above

12 Young growth distinctly square
16 in cross-section; leaves hairy beneath — Lonicera (p.—)

12 Young growth round in cross-
16 section

14 Leaves elliptical, sharpened
18 at the apex

16 Veins 3-5, arising near
20 the base of the blade — Philadelphus (p.—)

16 Veins 12-15, branching from
20 the mid-vein — Cornus (p.—)

14 Leaves oval, blunt at the
18 apex

16 Flowers and fruit in pairs
20 on a slender stalk; leaves never toothed — Lonicera (p.—)

16 Flowers and fruit one to
several in a short cluster;
20 some leaves usually on suckers, toothed as though bitten into — Symphoricarpos (p.—)

4 4b. Leaves alternate

6 Branches armed with stout thorns an inch
10 long or less, only [illegible] at the foot of the leaf-stalk — Crataegus (p.—)

6 Branches unarmed, or if armed, the spines mostly
10 a quarter inch long or less and occurring on the stem as well as at the foot of the leaf stalk.

8 Leaves roundish in outline, all lobed like
12 ~~similar to~~ a maple leaf .

10 Leaves bearing spines
14 4-10 mm. long on the veins beneath — Oplopanax (p.—)

10 Leaves not spiny beneath

12 Leaves commonly 15-20 cm.
16 across; stems canelike, second year growth brown with a pronounced pith — Rubus (p.—)

12 Leaves commonly smaller;
16 stems branching and woody — Ribes (p.—)

8 Leaves oval, oblong or elliptical in
12 outline, rarely roundish (see Populus), the margins toothed or perfectly smooth; pinnately lobed in Dasiphora

10 5a. Leaf margins entirely smooth, not
14 at all toothed or scalloped.

12 Leaves with a pair of flap-like
16 appendages 3-12 mm. broad or more (stipules) at the base of the leaf-stalk, at least on suckers or vigorous branches; tree-like shrubs or small trees commonly found in stream bottoms — Salix (p.—)

12 Leaves without such appendages

14 Leaves wider above the middle

16 Low bush intricately twiggy; leaves
20 distinctly petiolate, petioles thinly hairy — Menziesia (p.—)

16 Taller bush with conspicuously naked
20 lower stems, leaves scarcely petiolate, the short petioles rusty-pubescent — Rhododendron (p.—)

14 Leaves wider near or below the
18 middle, leathery, lower surface whitish or silvery

16 Lower surface of leaves
20 sprinkled with resin dots; odor of turpentine when crushed — Ledum (p.—)

16 Lower leaves not sprinkled with resin dots

18 Leaves strongly revolute; leathery

20 Leaves linear-oblong, 2-4 mm. wide Andromeda (p.—)

20 Leaves ovate, 6-12 mm. wide Kalmia (p.—)

18 Leaves plane; not leathery Vaccinium (p.—)

10 5b. Leaf margins either coarsely or finely toothed or scalloped; pinnately lobed in Dasiphora

12 Leaves pinnately 3-7-lobed nearly to the mid-rib; bark cinnamon brown, flaking away Dasiphora (p.—)

12 Leaves toothed or scalloped, not at all lobed

14 Leaves rarely more than one inch wide, usually 3-4 times as long, some at least, with a pair of flap-like appendages (stipules) 3-12 mm. broad or more at the base of the leaf-stalk at least on suckers or vigorous branches; tree-like shrubs or small trees commonly found in stream bottoms Salix (p.—)

14 Leaves without such appendages

16 Leaves commonly less than 2-5 cm. long

18 Leaves ~~[illegible]~~ roundish, very [illegible] above, scalloped; clump type shrub of bogs Betula (p.—)

18 Leaves ~~[illegible]~~ seldom roundish and if so, sharply toothed, dark green above but hardly glossy

~~[illegible]~~

20 Leaves ~~[illegible]~~ very blunt and rounded at apex and base, toothed chiefly above the middle; bark grey Amelanchier (p.—)

20 Leaves ~~2-5 cm. long~~ very smooth, roundish or egg-shaped, finely toothed to the base of the blade with a short abrupt point at the apex; leaf-stalks about as long as the blade; bark white and powdery Populus (p.—)

16 Leaves 5-15 cm. long or more, egg-shaped or triangular,
20 oval or elliptical in outline

18 Leaf-stalks 2.5-10 cm. long, commonly 5-8 cm. and
22 veiny beneath — Populus (p.)

18 Leaf-stalks seldom 2.5 cm. long, usually 6-12 mm.,
22 often nearly wanting

20 6a. Leaves distinctly egg-shaped, widest below the
24 middle, margins toothed; leaf-stalks averaging about 12 mm.

22 Lateral veins 2, arising near the base of the
26 leaf, three veins thus prominent — Ceanothus (p.)

22 Lateral veins several, arising from the midvein

29 Leaves soft-hairy beneath

26 Leaves 3-6 cm. long, wedge-shaped or
30 subtruncate at the base, obtuse at the apex — Holodiscus (p.)

26 Leaves 6-8 cm. long, abruptly acuminate at
30 the apex, subcordate and rounded at the base — Corylus (p.)

24 Leaves smooth or lightly hairy, chiefly on the
28 veins beneath

26 Bark bronze-color to chalky white, outer bark
30 peeling easily; leaves abruptly and sharply pointed at the tip — Betula (p.)

26 Bark grey, dull, whole bark peeling together;
30 leaves rather bluntly pointed — Alnus (p.)

2066b. Leaves oval or elliptical; leaf-stalks 12 mm. long
29 or less

22 Leaves rather coarsely and sharply toothed in the
26 upper two-thirds, the lower third of the margin smooth — Spiraea (p.)

22 Leaves finely toothed throughout or nearly smooth

24 Leaves 2-7 cm. long, leaf-stalks 4 mm. or less

26 Leaves broadest above the middle; thinly hairy
30 beneath — Menziesia (p.)

26 Leaves broadest near or below the middle;
30 not hairy — Vaccinium (p.)

24 Leaves 8-15 cm. long, leaf-stalks about 6-12 mm.

26 Bark very bitter to the taste and distinctly
30 yellow inside when peeled — Rhamnus (p.)

26 Bark more or less bitter but with a distinct
30 flavor of peach pits, usually resembling cherry bark externally and not yellowish inside when peeled — Prunus (p.)

Key to Plants normally living in Water

It is obviously difficult to distinguish between "aquatic" and "terrestrial" plants since many are able to accomodate themselves to varying degrees of submergence or desiccation. For example, Nymphozanthus polysepalus is ordinarily an aquatic growing in several feet of water yet it may be found late in summer growing in some places in quite dry ground.

0 1a. Plants with floating leaves (which) resemble a 4-leaved clover — Marsilea (p. —)

0 1b. Plants not as described

2 Plants with erect hollow stems which bear minute triangular

6 leaves closely pressed to the joints, the branches when

present appearing in whorls at the joints (Horsetails) — Equisetum (p. —)

2 Plants not as described

4 2a. Minute plants not rooting (in earth) but floating on the surface,

8 forming a scum

4 Each disc-like leaf bearing 2 or more rootlets which hang

10 in the water — Spirodela (p. —)

4 Each disc-like leaf bearing a single rootlet — Lemna (p. —)

4 2b. Plants not as described

6 Leaves reduced to basal scales, seemingly none; rushes

10 1-3 m. tall — Scirpus (p. —)

6 Leaves obvious

8 Leaves trifoliolate, the leaflets 3.5-7 cm. broad — Menyanthes (p. —)

8 Leaves sometimes pinnate or forked, usually entire

12 and simple

10 Leaves pinnate or forked, the segments linear or

14 hairlike

12 Leaves bearing minute green bladder, 1 mm. or less (S)

16 in diameter Utricularia (p.—)

12 Leaves not as described

14 Leaves in whorls of 3-9

16 Leaves 2-3 times forked Ceratophyllum (p.—)

16 Leaves pinnatifid Myriophyllum (p.—)

14 Leaves alternate Ranunculus (p.—)

10 Leaves simple

8 Leaves oval, rotund, elliptical or sometimes sagittate

14 Leaves sagittate Sagittaria (p.—)

14 Leaves not sagittate

16 Leaves peltate Brasenia (p.—)

16 Leaves not peltate

18 Leaves entire at the base

20 Leaves longitudinally ribbed

22 Plants of shallow water or muddy places Alisma (p.—)

22 Plants of 1-3 feet of water or more Potamogeton (p.—)

20 Leaves pinnately veined Polygonum (p.—)

18 Leaves deeply cut at the base

20 Cut equal to half the length of the blade Nymphaea (p.—)

20 Cut equal to 1/3 the length of the blade

24 or less Nymphozanthus

2 — 12 — 3a. Leaves linear

14 3a. Leaves basal

1a Herbs 1-2 m. tall; leaves swordlike — Typha (p.—

1b Herbs rarely as much as 90 cm. tall, usually

2a much less

18 4a. Leaves mostly 5-30 mm. long

2a Plants submerged in usually 1-2 feet of water

along shelving sand lake shores, never

2 { forming flowers, the leaves abruptly

expanded and membranous at the base — Isoetes (p.—

2a Plants not as described

2a2 Flowers in globose heads — Sparganium (p.—

2a1 Flowers in racemes — Triglochin (p.—

18 4b. Leaves 3-5 cm. long

3a Leaves acute, tapering — Subularia (p.—

3b Leaves expanded towards the tips — Limosella (p.—

14 3b. Leaves distributed along the stems

6 5a. Leaves opposite or whorled

7a Leaves in whorls of 6-9 or more — Hippuris (p.—

7b Leaves in whorls of 3 (see 3rd categ.) — Elodea (p.—

7a Leaves opposite

8a Leaves provided with minute spines along the

margins as viewed with a lens — Naias (p.—

8b Leaves entire

9a Leaves commonly 2-5 cm. long — Zannichellia (p.—

9b Leaves commonly .5-2 cm. long — Callitriche (p.—

5b. Leaves prevailingly alternate

10a Very fragile herbs of shallow water with

threadlike stems and leaves; flowers axillary — Howellia (p.—

10b Commonly coarse herbs, rarely with flattened

linear leaves; flowers in spikes — Potamogeton (p.—

A. Pteridophyta. Ferns and Fern Allies.

Terrestrial or aquatic plants with green foliage, having usually an underground stem which bears one or more leaves, these often tufted. Flowers and seeds none, reproduction being effected by spores which are formed in usually minute globose or watch-shaped sacs (the sporangia). These sporangia are in some cases assembled into small clusters (the sori) and may or may not be partially covered by a membrane of varied shape (the indusium). The spores thus produced are usually of one size but may be of two sizes, in which case the larger are termed the megaspores and the smaller the microspores. On germination the spores give rise to a small, or even minute, plant known as the gametophyte. In general the spores when of one kind give rise to a monoecious thallus-like short-lived gametophyte (the prothallus), when of two kinds, the megaspores to an archegonial plant, the microspores to an antheridial plant. The gametophytes, whether monoecious or dioecious, alone bear the sex organs (the gametangia) and sex cells (or gametes). The product of fertilization grows within the female gamete-bearing organ (the archegonium) and eventually into the familiar more or less long-lived spore-bearing plant (the sporophyte). Classification is based upon the habit of the sporophyte and the nature of sporangial leaves (the sporophylls) and of the spores.

Equisetaceae. Horsetail Family.

Rush-like or feathery bushy plants with typically harsh, roughened stems by abundant silica tubercles. The rhizomes perennial, slender, often vertical, tapering, blackish, freely branching in age, with tufts of fine hypha-like brown roots at the nodes. Aerial stems evergreen and perennial or annual, erect, simple or with verticillate branches at the nodes, the internodes hollow, fragile, finely fluted or grooved. Leaves minute, reduced to dark, often bristle-like teeth united by their bases into cylindrical sheaths; the sheaths, now green and unbanded, now strongly banded, always covering the nodes. Strobili of two kinds, either vernal, and often pale and whitish, appearing before the plumose sterile verticillate branched shoots, or aestival, often dark or blackish, terminal upon the tips of the ordinary rush-like unbranched shoots. Sporophylls arranged in close-set circles upon a central axis, often hexagonal, bearing the sporangia as pendant sac-like structures from the peltate summit of the sporophyll. Spores of one kind, green, encircled by 4 hygroscopic ribbon-like bands (elaters), effective in spore dispersal.

1. Equisetum L. Horsetail. Scouring Rush.

Characters of the family.

0 Stems with few several whorls of branches (E. fluviatile seldom 4 branched)

2 Branches again branched at maturity, more or less distinctly

6 recurving, feathery and delicate 1. E. sylvaticum

2 Branches unbranched, spreading or ascending

4 Principal sheaths of sterile shoots 4-8 mm. long; teeth

8 with indistinct or no hyaline-scarious margin 2. E. arvense

4 Principal sheaths of sterile shoots 12-15 mm. long; teeth

8 with distinct white or silvery hyaline-scarious margin 3. E. palustre

0 Stems without branches (E. fluviatile seldom branched)

2 Stems stout, 7-8 mm. in diam.; teeth of all but uppermost

6 sheaths early deciduous; sheaths prominently black and white banded 4. E. hyemale

2 Stems slender, 2-5 mm. in diam.; teeth all persistent; sheaths

6 black or green and black, but not strongly banded

4 Branches 2 mm. in diam., in more or less tufted clumps;

8 sheaths black, conspicuous 5. E. variegatum

4 Branches 4-5 mm. in diam., simple or few, not tufted;

8 sheaths mostly green, inconspicuous 6. E. fluviatile

1. E. sylvaticum L. Wood Horsetail. Graceful slender plants, commonly their stems simple from a slender rootstock, 30-50 cm. tall, the ribs uniform, finely scabrous, the furrows 12, very fine and inconspicuous, rather shallow; sheaths loose, the lowermost somewhat inflated, 6-10 mm. long, those of the stem with 8-14 acute subappressed teeth, those of the ultimate branchlets acerose, 2 mm. long, spreading; strobilus borne on tips of leafy spring shoots before the sterile summer herbaceous ones.

Known with us only from Priest R. drainage at 2500-3000 feet, Epling 6582, this collection in moist woods. ~~Our plants~~ represent var. pauciramosum Milde, with fewer scattered whorls of branches than the typical species.

2. E. arvense L. Common Field Horsetail. Coarse pale-green plants, the stems commonly several from slender rhizomes, 30-60 cm. tall, 6-19 furrowed, the grooves open, prominent; sheaths loose, the lowermost spreading upwards, 9-11 mm. long, dark or brown-black, with slender acuminate teeth, those of midstem subappressed, of the slender branches inconspicuous, ovate, with abruptly acuminate bristle-tipped teeth, these closely appressed; strobilus borne on short unbranched spring shoot, followed by the several sterile summer herbaceous shoots.

Common in springy places, moist roadsides and damp woods, forming often dense colonies of several hundred plants. Forma proliferum (Luerrs.) Braun, with cones borne on tips of sterile leafy summer shoots, as Fish Lake, Epling & Houck 9727, is occasional over the whole cosmopolitan range of the species.

3. E. palustre var. americanum Victorin. Marsh Horsetail. Slender plants, their stems commonly arising singly from a slender rootstock, ~~the stems~~ lax or even decumbent upon herbage, 40-60 cm. tall, of 1 kind, prominently deeply 5-9 grooved, the furrows separated by thin wing-like ribs not harsh to touch; the sheaths loose, all spreading upwards and thus basket-like, the lowermost and those of midstem 11-13 mm. long, with pale, brown-margined lance-acuminate teeth, those of divaricate branches 2-3 mm. long, the teeth erect or spreading; strobilus crowning the ordinary herbaceous shoots in summer, bluntish or barely acute, commonly borne well above the remote whorls of subtending branches of shoot.

Known in our region only from Priest R. drainage, in wet meadows at elevations of about 3000 feet, as at Hughes Mdw., Epling 7362.

4. E. hyemale var. californicum Milde. Tall Scouring-rush. Stout scaberulous-stemmed plants, arising from strong somewhat vertical rootstocks, the stems evergreen, erect, often stiff, 0.5-1.0 m. tall, of 1 kind, 8-34 furrowed, the ridges roughened by 2 indistinct vertical rows of silica tubercles, rounded, the furrows shallow, about compensating for the ridges; sheaths conspicuous, permanently banded with a dark brown to black zone bordered by white, the lower 7-10 mm. long, with a flaring rim, the upper a little shorter, subappressed, all but uppermost with teeth early deciduous, the teeth ovate-triangular, tipped by a short flexuous bristle; strobilus often large, crowning the ordinary herbaceous shoots late in the season, abruptly cuspidate, the cusp black, conspicuous, the strobilus always somewhat enveloped by the subtending sheath.

Infrequent in our region, perhaps overlooked, in cottonwood bottomlands. Upper Priest Lake, Epling 7724.

5. E. variegatum Schleich. Low slender tufted plants, with short internodes and somewhat swollen geniculate nodes provided with black sheaths, arising from slender to stout rootstocks, the stems erect or ascending, not stiffish, several, noticeably brittle and easily disarticulating, 5-10-furrowed, finely roughened by silica tubercles, the ridges rounded, about compensating for the shallow furrows; sheaths all subappressed, the lower 2-4 mm. long, the uppermost shorter, blackening distally in age, all permanently tipped with lance-acuminate white-margined teeth; strobilus inconspicuous, crowning the ordinary herbaceous shoots of summer, narrowly-oblong, bluntish or even truncate at maturity, well exserted from sheath.

Known in our region only from stream banks and sand bars of Upper Priest R., 3000 ft., Epling 7418.

6. E. fluviatile L. Snake Grass. Slender subscandent aquatic plants, arising from slender unbranched subvertical rootstocks, the stems watery-herbaceous, laxly procumbent, 60 cm. to 1 m. long, shallowly few- to many furrowed, the ridges somewhat indistinct, minutely siliceous-roughened, rather thin, somewhat wing-like in age; sheaths all subappressed, cylindric, the lower 6-8 mm. long, darkening, the upper shorter, greenish, all permanently tipped with subulate castaneous teeth, the lowermost a little flaring; strobilus crowning an ordinary summer shoot, ~~when shoot commonly simple,~~ developing simple subfiliform branches after fruiting, the strobilus ovoid, obtuse, stipitate-exserted beyond the sheath. (E. limosum L.)

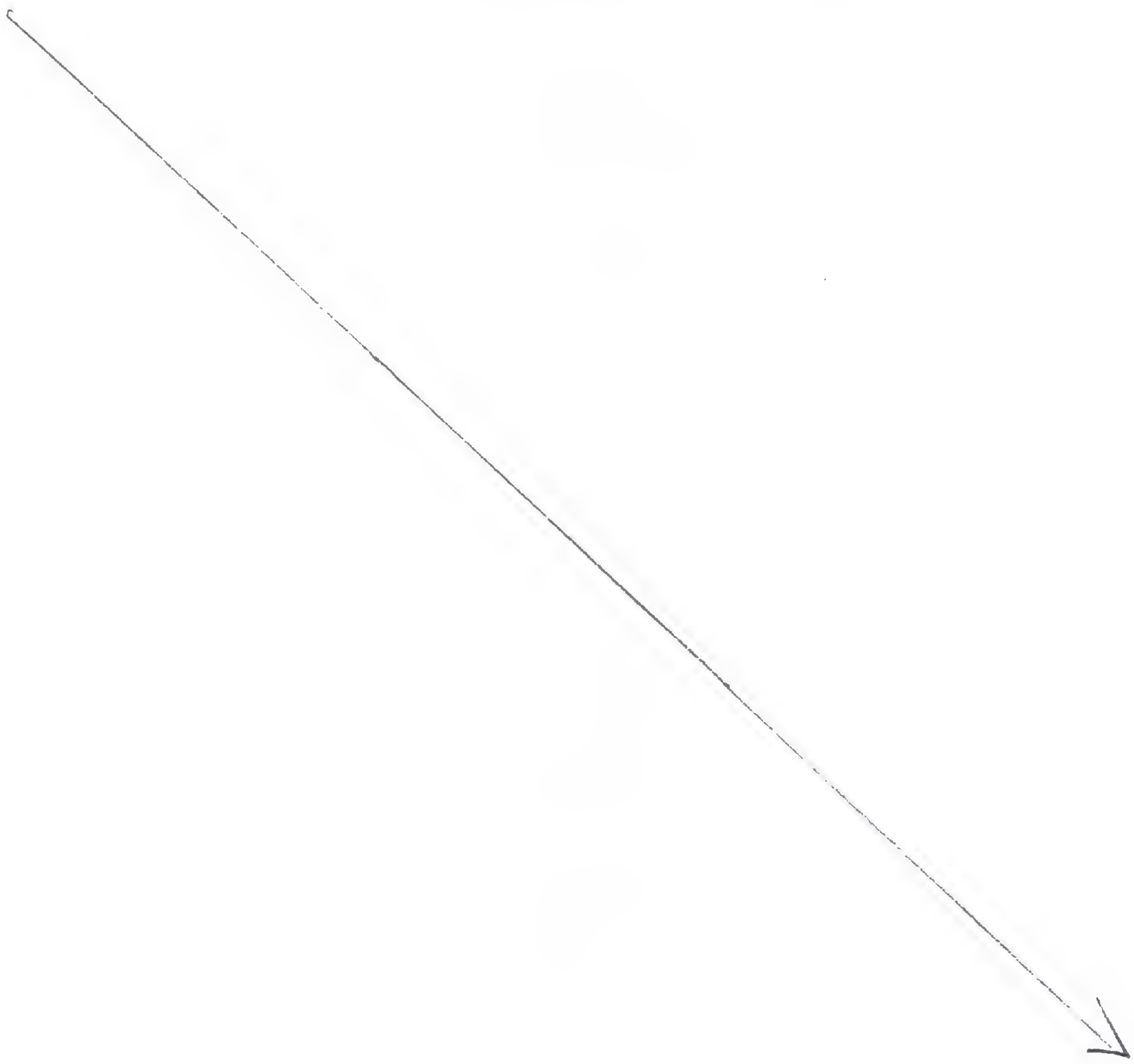
Swamps and river banks; known in our region only from Upper Priest Lake, 2700 ft., Epling 7199.

Isoetaceae. Quillwort Family.

Perennial grass-like plants of submerged, amphibious or terrestrial habit, arising from a shallow woody 2- or 3-lobed corm, bearing a tuft of erect or recurved grass-like leaves. Leaves producing a small triangular outgrowth or flap of tissue (the ligule) above the single round or oblong axillary sporangium which is set in a basal depression of the leaf, the sporangium more or less covered by a membranous extension of tissue (the velum) on inner leaf face. Sporangia solitary, sessile in axils of leaves, and somewhat distending them, of two kinds, microsporangia, bearing microspores, minute, powdery, ovoid, which on germination, produce antheridial gametophytes, and megasporangia, bearing megaspores, characteristically hemispherical, larger, which on germination, produce archegonial gametophytes.

I. Isoetes L. Quillwort.

Characters of the family.



0 Amphibious plants of wet muddy shores; leaves mostly 15-24 cm. long, the blades slender, soft, linear from an abruptly narrowed membranaceous base 4 — 1. I. Howellii

0 Immersed aquatics in 0.5-6 feet of water; leaves mostly less than 15 cm. long, firm to rigid, gradually tapering from a wide membranaceous base 4

2 Stomata usually few; sporangia oblong; megaspores white, spinose; 6 microspores usually smooth; leaves often spreading — 2. I. Braunii

2 Stomata wanting; sporangia suborbicular; megaspores cream-colored, with low prominent crests, forming a network on basal face; microspores spinulose; leaves chiefly ascending 6 — 3. I. occidentalis

1. I. Howellii Engelm. Slender plants, the leaves 10-30, long acicular, slender, bright green, often abruptly narrowing from a wide membranaceous base, or again tapering for 1-5 cm. above the sporangium level, the stomata numerous; ligule narrow, elongated-triangular; sporangia orbicular to oblong, 3-6 (or 8) mm. long, often brown-spotted, as much as 1/3 covered by velum; megaspores white, variously finely tuberculate, microspores chiefly smoothish.

Amphibious in wet ground about ponds, on stream and lake shores, our most common Isoetes at middle elevations, the spores maturing in adjacent mud when the plants are growing in standing water. Paradise Cr. near Moscow; forks St. Maries R.; Lake Coeur d'Alene; Lake Pend Oreille; Sandpoint.

I. Bolanderi Engelm. A closely related species, of submersed habit, the stomata few, sporangia 3-4 mm. long, 1/4-1/3 covered by velum, megaspores obscurely tuberculate, the microspores more or less spinulose. To be expected in the southern part of our region; Bear Cr., Bitter Root For. Res., Leiberg 2939.

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2. I. Braunii Durien. Submersed stout plants, the leaves usually 10-35, straight or recurved, often divaricate, firm, tapering from the wide base, mostly 8-15 (or sometimes 25) cm. long, the stomata few; ligule deltoid; sporangia oblong, 4-7 mm. long, spotted, more or less completely covered by the velum; megaspores white, spinose, or less often the spines confluent into short ridges; microspores light brown, usually smooth.

Known in our region only from sandy bottoms of Upper and Lower Priest Lakes, 2700 ft., Epling 7737, 7830, in the latter forming large patches of several acres in extent, in from .5 2-3 feet of water.

3. I. occidentalis Hend. Submersed aquatic herbs, the leaves 9-30, dark green, rigid, tapering from a wide base, 5-15 (or 20) cm. long, the stomata wanting; ligule short-triangular; sporangia suborbicular, 5-6 mm. long, about 1/3 covered by the velum; megaspores cream-colored, with low conspicuous crests, these simple on the apical faces, forming a network on the basal face; microspores spinulose. (I. lacustris var. paupercula Engelm.).

On sandy bottoms of Priest Lake, Piper 3689, and Lake Coeur d'Alene, fide Pfeiffer; at the latter station in from 1/2 to 6 feet of water.

Marsileaceae. Water Clover Family.

Herbaceous amphibious perennials from slender creeping rhizomes and ~~----->~~ bearing long-petioled usually 4-foliolate leaves. Sori borne at the ground level within bony, ovoid, 2-loculed pedunculate sporocarps, the sporocarps, arising from the rhizome near the base of the petioles or upon them. Spores of two kinds, numerous microspores in microsporangia liberated by dehiscence of the sporocarp, and solitary megaspores, in the few megasporangia likewise exposed in sori at dehiscence of the sporocarp. In general the microspores give rise to antheridial gametophytes, the megaspores, to archegonial gametophytes.

1. Marsilea L. Water Clover.

Somewhat tufted low clover-like plants. Sporocarps ovoid, the 2 locules with many transverse partitions, on dehiscence producing a mucilaginous soriferous film of tissue, the sori more or less embedded in membranous envelopes.

1. M. vestita Hook. & Grev. Rhizomes silky-hairy at the nodes, the leaves varying on the same plant, 5-20 cm. long, with slender hairy but ultimately glabrescent petioles, the leaflets sessile, cuneate-obovate, entire, glabrate in age, 5-12 mm. long; peduncles short, rather stout; sporocarps solitary, flattened-subglobose, 3-6 mm. broad, hirsute when immature, less hairy in age.

In heavy to sandy soils of drying pools and roadside ditches, often locally abundant, of variable size, the non-fruiting taller plants in deeper water, those forming sporocarps where the water has receded.

Selaginellaceae. Selaginella Family.

Low moss-like herbs, the stems slender, branched, of prostrate or creeping habit. Leaves small, either thin-membranous and spreading, forming frond-like sheets of foliage, or firm and closely imbricated in overlapping 4-ranked rows upon the shoot axis. Sporangia axillary, in terminal 4-angled spicate strobili of leaves which often differ but little from the ordinary foliage leaves, bearing spores of two kinds, the larger (megaspores) 1-4, the smaller (microspores) very numerous, minute, powdery. Gametophytes retained nearly or wholly within the spore walls, both male and female gametophytes dependent upon stored food of the spores.

1. Selaginella Beauv. Small Club Mosses.

Characters of the family.

O Leaves rhombic- or oval-oblong, obtuse, merely cuspidate,

4 < bright green; spreading frond-like thin mat herbs on shaded moist banks — 1. S. Douglasii

O Leaves oblong-linear, narrowed to an obtuse apex, setose,

4 < yellowish-green; dense more or less stiff mat herbs on rock slopes and summits — 2. S. Wallacei

1. S. Douglasii (Hook. & Grev.) Spring. Delicate pretty herb of prostrate creeping habit, the stems 15-35 cm. long, rooting throughout, the branches leafy throughout; leaves in 4 ranks, those of 2 upper rows smaller, rhombic-ovate, those of the 2 lateral rows oval-oblong, 2-3 mm. long, all obtuse; strobili dense, quadrangular, 5-12 mm. long, of closely imbricated sporophylls, these cordate-ovate, acuminate, keeled, membranous.

On wet rocks and shaded banks, occasional in our region.

2. S. Wallacei Heiron. Loosely caespitose mat herbs, the stems prostrate, numerous, ascending, freely branching with short often intricate branches, 1-4 cm. long; leaves closely imbricated in 4-ranked rows, mostly oblong-linear, ciliolate, about 2.5-3.5 mm. long, narrowed to a short white bristle; spikes numerous, curved, slender, 1-3 cm. long, of close-set firm, ovate-deltoid ciliolate sporophylls.

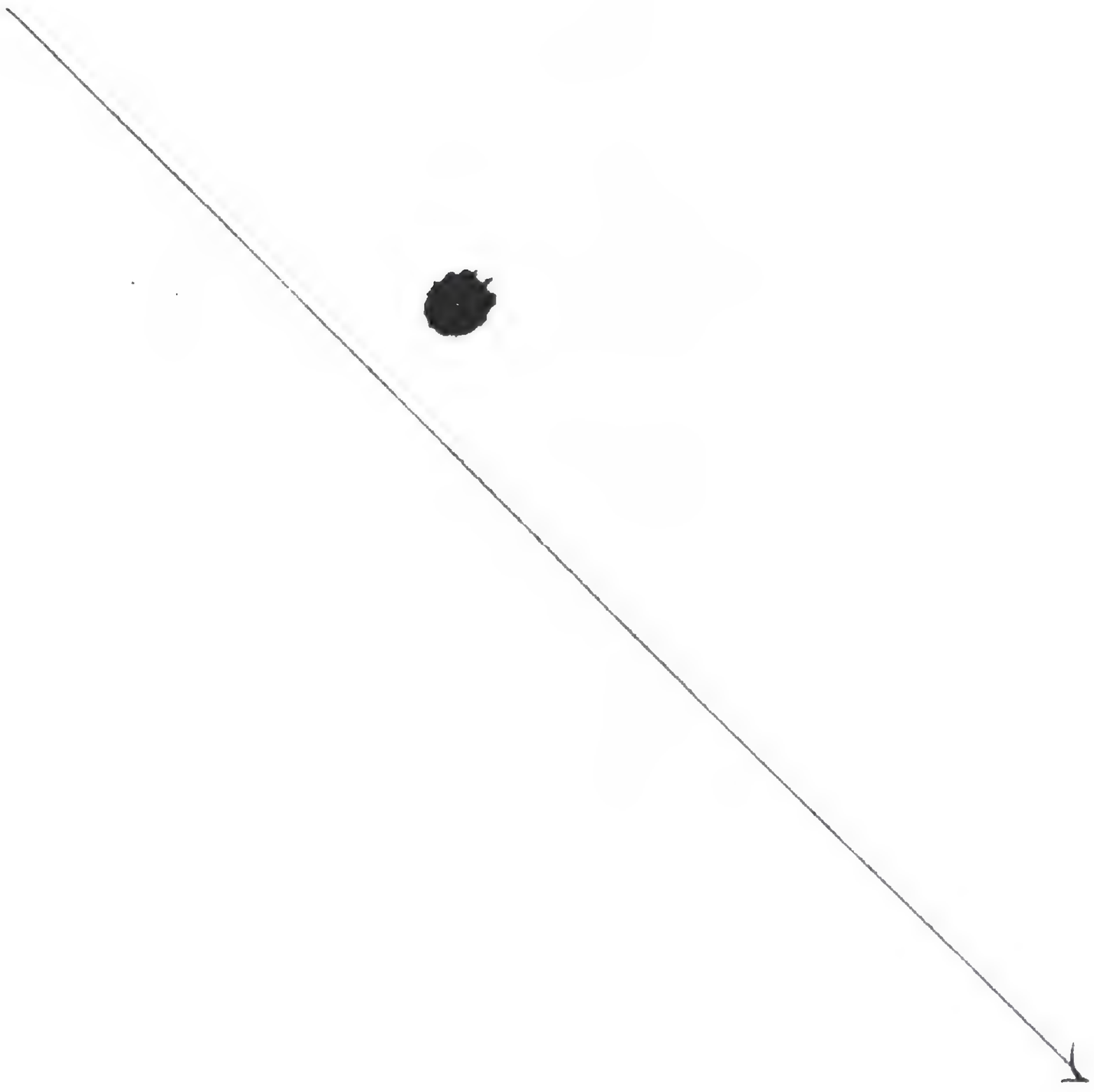
On dry rock slopes and open ridges. The Selaginellas of our region need closer collecting and study; both S. montanensis Hieron. (? S. columbiana A. A. Eaton) and S. densa Rydb. perhaps occuring here.

Lycopodiaceae. Club-moss Family.

Moss-like pleasingly fragrant, rigid to soft-herbaceous plants of somewhat mat-forming habit, upright or trailing habit, from fine fibrous roots with the stems leafy, usually with several apparently alternate or repeatedly 2-forked branches; leaves small, simple, with a midnerve only, entire or finely serrulate, continuous with and decurrent upon the shoot axis, usually imbricate and often resembling the foliage of Thuja. Sporangia reniform or orbicular, 1-loculed, compressed, either solitary or axillary at tips of ordinary leafy shoots or congested in terminal pedunculate or sessile strobili. Spores of one kind, very numerous, globose, sulphur-yellow.

1. Lycopodium L. Club-moss.

Characters of the family.



0 Stems chiefly upright; sporangia in axils of ordinary leaves 1. L. Selago

0 Stems chiefly horizontal with erect or ascending branches; sporangia

4 in specialized strobili of numerous close-set sporophylls

2 Aerial branches of bushy tufted habit by repeated upwards

6 < branching of stems, thus like a miniature tree; strobili sessile — 2. L. obscurum

2 Aerial branches loosely ~~dopcatedly~~ forking, sometimes tufted

as described

6 but never ~~dendroid-branch~~; strobili sessile or pedunculate

4 Leaves ~~cypress-like~~ short, thick, awl-shaped, appressed;

8 strobili ca. 1 cm. long, sessile — 3. L. sitchense

4 Leaves ~~moss-like,~~ linear-lanceolate, bristle-tipped, thin,

8 < spreading; strobili ca. 3 cm. long, pedunculate, in 2's or 3's — 4. L. clavatum

1. L. Selago L. Fir Clubmoss. Stems several, erect, in compact stiffish tufts, 5-18 cm. tall, arising from short abundantly rooting prostrate stems clothed with persistent dead brown leaves; leaves of current season dark green, ascending or subappressed, linear-acuminate to an abruptly acute tip, 5-12 mm. long, entire; sporophylls more or less alternating with ordinary sterile leaves ~~not forming strobili~~, but a little shorter and more triangular; ~~the~~ sporangia reniform.

Occasional, in deep woods and along rocky outcrops, 2700-5000 feet; Plowboy Mt., Sipe; N. Fk. Upper Priest R., Epling 7059; Fish Lake Cr., Epling & Houck 9484. Forms bearing vegetative gemmae in axils of most of leaves are not uncommon.

2. L. obscurum L. Groundpine. Fragrant pale-green bushy herbs with aspect of ~~conifer~~ seedlings, arising from stout wiry running rootstocks, the stems repeatedly branching, all beset with subulate-acicular spreading leaves, 3-5 mm. long, acute to a cuspidate tip, entire; sporophylls broadly ovate, acuminate, papery, erosulate, crowded into sessile strobili; ~~the~~ sporangia reniform.

Known in our region ~~only from~~ woods, Upper Priest Lake, 2700 ft., Epling 7731.

3. L. sitchense Rupr. Fragrant low tufted somewhat procumbent or mat-forming herbs, arising from stout rhizomes, the stems ascending, numerous, 4-8 or more cm. tall, the leaves short, thick, awl-shaped or ovate-acuminate, appressed, 3-5 mm. long, incurved at the acute tips, entire; sporophylls broadly ovate, erosulate, abruptly acuminate, papery, crowded in short rather dense sessile strobili.(L. sabinaefolium var. sitchense Fern.)

Creeping over rocks, rare in our region, Lion Cr., 4000 ft., Kaniksu Forest, Epling & Houck 10273.

4. L. clavatum L. Running-pine. Pleasantly fragrant bright green creeping herbs from stout wiry rootstocks, forming often extensive net-like ground cover, the fertile branches erect, stiffish, 10-15 cm. long at maturity, beset with loosely imbricate leaves, arising from stout terete sparsely leafy running stems; leaves linear-subulate, bristle-tipped, entire, 4-7 mm. long, spreading in age; sporophylls ovate-acuminate to a long hairlike bristle, hyaline-scarious, ciliolate, thin, crowded into elongate-cylindric strobili, 2.5-3.5 (or 6.5) cm. long, in long-pedunculate clusters of 2 or 3 (to 5) erect strobili borne well above the foliage, the sporangia round-reniform.

Our most common Lycopodium, of moist shaded hillsides and woods, 2700-5000 feet, forming colonies locally.

Ophioglossaceae. Adder's-tongue Family.

Ours herbaceous fleshy plants of more or less fern-like habit, arising from a short fleshy rhizome bearing thickish cord-like roots and one or two leaves with basally or medianly attached fertile sporophylls. Sporangia naked, opening by a transverse slit, the spores of one kind, yellowish, germinating to give rise to tuberlike subterranean non-chlorophyllous gametophytes with endophytic root-inhabiting fungi (mycorhiza).

1. Botrychium Swartz.

Rhizomes commonly invested with old fibrous persistent leaf bases, bearing 1-3 fronds upon a partially subterranean common stalk, divided above into sterile leafy and fertile more or less paniculate non-leafy portions. Leaves various, simply pinnate to ternate and decompound into finely divided ~~pinnatifid~~ segments. Spores abundant, like sulphur powder. Buds of following year terminal on the rhizome, enveloped within the sheathing base of the common stalk of the frond.

0 Sterile blade inconspicuous, arising from above middle of stem,

4 pinnatifid into a few irregular thickish lobes 1. B. neglectum

0 Sterile blade fern-like, conspicuous, arising from near base of

4 { stem, decompound into many symmetrically arranged teeth or divisions

2 Blade thin-textured, the ultimate segments acute, denticulate;

6 { bud pilose, emerging from a sheathing cavity near base of stalk 2. B. virginianum

2 Blade thick-textured, even subcoriaceous, the ultimate segments

6 { bluntish or obtuse, crenulate; bud hairy, emerging from near base of stalk, not sheathed 3. B. multifidum

1. B. neglectum Wood. Inconspicuous plants, the stems 5-15 cm. or more tall, often fleshy, simple, arising from a slender vertical rootstock, the sterile blades short-stalked, ovate-oblong in outline, commonly once pinnate or simply pinnatifid into 2-4 pairs of roundish or oblong-obtuse pinnae, the segments irregularly lobed; sporphyll usually bipinnate, the spores tuberculate.

Growing in sandy soils of shaded woods among grasses, where easily overlooked. So far known in our region only from Upper Priest R., 3000 ft., Epling 7457. This coll. is cited by Clausen as B. matricariaefolium Braun, thus aligning our plants with that European species.

2. B . virginianum (L.) Swartz. Rattlesnake Fern. Medium-sized fern-like plants, the stems 30-45 cm. tall, arising from a slender vertical rootstock, the sterile blades ternate, borne lateral to the stalk, each division obliquely bipinnate, 12-15 cm. long, rather thin-textured, the pinnae arising obliquely, the ultimate segments cuneate-obovate, denticulate with acute teeth; sporophyll bipinnate, long-pedunculate, commonly borne well above the foliage.

Occasional in deep woods of bottomlands, Priest R. drainage, 2700-3000 feet, Epling 7175. Butters segregated var. occidentale upon sporangial characte The type came from "deep woods near south end" of Lake Pend Oreille (Sandberg e 762 at Gray Herb.).

3. B. multifidum subsp. silaifolium (Presl) Clausen. Leathery Grape-fern. Coarse fleshy-textured fern-like plants, arising from slender deep-seated rootstocks, bearing 1 or 2 sterile fronds, each hastate-triangular to pentagonal in outline, suggesting Angelica, tripinnate, the lowermost primary divisions the longest, 10-15 cm. long, inequilateral, the basal subdivisions projecting downwards, 1-2 pinnatifid, all the ultimate segments rounded, obtuse, more or less crenulate with fine irregular teeth, venation obscure; sporophyll tripinnate, long-pedunculate, the panicle ample, up to 15 cm. long, usually borne above the foliage.

Occasional, apparently of sporadic occurrence, in rich shaded bottomlands, 2000-3000 feet; Santa, Epling & Offord 8593; Orogrande Cr., Epling & Houck 9310. Somewhat indistinctly separable in our region is the subsp. Coulteri (Underw.) Clausen, with the fronds distinctly fleshy, smaller, the lowermost primary divisions 7-10 cm. long, subequilateral, the ultimate segments approximate or overlapping to give a dense somewhat pentagonal frond; in willow swamps and among rocks of lakeshore, Cocolalla, Christ 1601; Upper Priest Lake, Epling 7746.

Polypodiaceae. Fern Family.

Leafy, more or less caespitose plants of various habit and growth form, arising from chaffy short and subvertical or long and stout horizontal rhizomes. The leaves (fronds) unfolding from a tight spiral coil and then resembling a violin head, finally producing a blade which in ours may be pinnately to nearly 4-times compound into coarse undivided to delicate membranous pinnatisect primary divisions (pinnae), the ultimate divisions (pinnules) various. Sporangia opening transversely by an incomplete marginal band of hygroscopic cells (annulus), borne in ours in defined clusters or dots (sori) on the lower surface of fronds of ordinary outline or (in Cryptogramma) on fertile fronds of central position which differ from the sterile ~~usually~~ outer fronds. Sori near the margins or against the midnerve of the pinnule, either with or (in Polypodium and Phegopteris without a membranous or firm scale-like covering (indusium), of circular, kidney-shaped or linear-arcuate outline, or (in Cheilanthes, Pteridium, Cryptogramma, and Adiantum) the indusia represented by false indusia, which are the more or less inrolled margins of segments; sometimes the indusia when present very early deciduous or minute and evanescent (in Athyrium). Spores minute, dust-like, abundant. Gametophyte (prothallus) monoecious, green, terrestrial, thallus-like, often cordate, appearing in the spring, ephemeral.

(Numbers refer to Genera) before the names

0 1a. Indusia wanting, the sori uncovered (indusium very minute or
4 evanescent in Athyrium)
3 Fronds ternately compound, about as broad as long 1. Phegopteris Dryopteris
2 Fronds once to thrice pinnatifid, distinctly longer than broad
4 Fronds merely pinnatifid once into subentire pinnae; sori at
5 tips of veins 2. Polypodium vulgare
4 Fronds thrice pinnatifid into small decompound segments; sori
5 borne on back of veins below apex 3. Athyrium americanum

0 1b. Indusia represented by false indusia which are the more or less
leaf- 4 altered margins of segments (see 1c)
2 2a. Fronds tomentose beneath, the sporangia imbedded in the rusty
6 matted wool, lance-linear in outline 4. Cheilanthes gracillima
2 2b. Fronds pubescent beneath with short hairs, ternate with 3
5 coarse broad divisions (see 2c) 5. Pteridium aquilinum
2 2c. Fronds glabrous
4 Fronds distinctly unlike, the fertile taller than the sterile,
5 and with narrower divisions, ~~being~~ linear, the sterile
ovate-oblong, obtuse. 6. Cryptogramma crispa
4 Fronds similar in outline, the fertile not differing
4 markedly
6 Fronds dichotomously forked with several pinnules arising
9 from one side of the two branches, of thin
texture 7. Adiantum pedatum
6 Fronds closely tripinnate, oblong-triangular in outline,
8 of thickish firm texture 4. Cheilanthes siliquosa

1c. True indusia present (see tips of fronds for persistent indusia)
2 Sori linear or curving in outline, more than twice as long as
4 broad 3. Athyrium filix-foemina
Sori roundish in outline or horse-shoe shaped.

4 3a. Indusia horseshoe-shaped, the sinus nearly closed,

3 of firm texture

6 Leaf-segments without spinulose teeth 8. Dryopteris filix-mas

6 Leaf-segments with spinulose teeth

3 Fronds bipinnate; stipes with a few pale chaff-like

12 scales 8. Dryopteris spinulosa

- Fronds tripinnate; stipes with several light

12 brown chaff-like scales 8. Dryopteris dilatata

and 4 3b. Indusia bladder-like or membranous, inflated and sac-like,

8 attached by one side; fronds rather membranous (see 3c) 9. Cystopteris fragilis

4 3c. Indusia peltate or stellate, attached by a central stalk

8 to the center of the sorus

6 Pinnae with a distinct auricle at the base, simply pinnate

8 Pinnae about 4 times as long as broad, with prominent marginal

12 prickle-tipped teeth 10. Polystichum lonchitis

5 Pinnae 8-12 times as long as broad, with short bristle-tipped

12 teeth 10. Polystichum munitum

6 Pinnae not auricled, more or less bipinnatifid

8 Fronds granulate-glandular 11. Woodsia scopulina

8 Fronds nearly or quite glabrous 11. Woodsia oregana

Artificial Key based on non-technical characters; numbers before the names refer to generic numbers.

0 1a. Sterile and fertile fronds of different form, the sterile green,

4 { parsley-like, the ultimate segments flat with toothed margins,
  { the fertile taller, yellowish, the ultimate segments inrolled,
  { the margins without teeth — 6. Cryptogramma crispa

0 1b. Sterile and fertile fronds of similar or even identical form or outline

2 Frond palmately compound into a symmetrical spray by forking of

6 stipe into 2 subequal 1-sided divisions — 7. Adiantum pedatum

2 Frond pinnately compound (sometimes basal segment of lowermost

6 pinna disproportionately long, giving a false-palmate aspect)

4 2a. Frond ternate with 3 subequal divisions, the whole as broad as long

8 or nearly so (triangular to pentagonal or obliquely deltoid)

6 Frond of thick texture, the margins inrolled; pinnae alternate → 5. Pteridium aquilinum

6 Frond of thin texture, plane; pinnae opposite — 1. Phegopteris Dryopteris

4 2b. Frond distinctly longer than broad in outline

6 3a. Frond strictly pinnate, the pinnae alternate

8 Pinnae upwardly lobed or eared at base; stipe and rachis

12 chaffy with shining red-brown papery scales

10 Fronds short-stiped, the lowermost pinnae suborbicular,

14 unlike the principal median pinnae — 10. Polystichum lonchitis

10 Fronds distinctly stiped, the lowermost pinnae falcate-lanceolate,

14 like the principal median pinnae — 10. Polystichum munitum

chaffy

8 Pinnae not lobed; stipe smooth or but little and rachis not at all

12 ~~chaffy~~ so — 2. Polypodium vulgare

6 3b Frond twice- to thrice-pinnately compound

8 4a. Fronds mostly less than 20 cm. long; stipe and rachis shining

12 { ebony to light brown; ferns of moderately to strongly
   { sunny habitats

10 Fronds granulate-glandular and ciliate beneath — 11. Woodsia scopulina

10 Fronds not glandular

12 Fronds thin-membranous; ferns of moist situations

14 Fronds linear-lanceolate, erect, rather strictly so,

18 in tufts — 11. Woodsia oregana

14 Fronds lance-ovate, spreading or even laxly

18 reclining on moist rocks — 9. Cystopteris fragilis

12 Fronds firm, somewhat thick-textured; ferns of dry rock

16 crevice habitats

14 Blade of frond about twice as long as broad, smooth or

18 inconspicuously thinly-hairy beneath 4. Cheilanthes siliquosa

14 Blade of frond 4-7 times as long as broad, this and

18 rachis densely hairy-tomentose beneath 4. Cheilanthes gracillima

8 4b. Fronds mostly more than 20 cm. long, the blades ample and

12 { expanded; stipe and rachis usually dull straw-colored;
ferns chiefly of moderate to deep shade ~~of woods~~ and around
springs

10 Basal pair of pinnae unlike all the others of frond, with

11 { very unequal outline, the basal-most divisions
downwardly directed { twice as long as those oppositely placed; stipe chaffy with thin light brown scales — 8. Dryopteris dilatata

10 Basal pair of pinnae in outline essentially like those of

11 remainder of frond

12 Fronds 10-15 cm. wide, rather strictly erect, the pinnae

16 { finely pinnatisect, crowded on the rachis, especially in the upper parts — 3. Athyrium americanum

Fronds more than 15 cm. wide, not of strictly erect posture

Fronds distinctly thin-membranous and fragile, rather densely crowded in heavy vase-like tufts upon the rootcrown 3. Athyrium filix-foemina

Fronds not conspicuously thin-textured, borne individually along the elongated rhizome and not at all tufted

Upper pinnae diminishing in size rapidly, the lower oppositely disposed and rather distant upon the rachis 8. Dryopteris spinulosa

Upper pinnae diminishing gradually in size to the tip, the lower alternately disposed and approximate upon the rachis 8. Dryopteris filix-mas.

1. Phegopteris (Presl) Fee. Beech Fern.

Vernal or aestival ferns of shaded woods, with slender spreading rootstocks with which the stipes are continuous and bright green somewhat membranous triangular fronds which decay in early autumn; sori small, round, without indusia, borne on the back of the veins below the tips of the pinnules.

1. P. Dryopteris (L.) Fee. Oak Fern. Fronds smooth, broadly triangular, 10-15 cm. wide, the stipe and rachis slender, ternate, the 3 triangular divisions all widely spreading, each 1- to 2-pinnate, the segments oblong, obtuse, entire or toothed; sori submarginal. (Dryopteris Linneana C. Chr.).

Rather frequent in Thuja and stream woods, at middle elevations, forming large or small colonies.

2. Polypodium (Tourn.) L. Polypody.

Ours ferns of partially shaded habitats, the stipes articulated to the creeping rootstock, usually smooth. Sori round, naked, dorsal, in two rows on each side of the midrib or irregularly scattered, each sorus borne on the end of a free veinlet.

1. P. vulgare var. columbianum Gilbert. Western Polypody. Fronds rather stiff and of firm texture, the blades dark green, oblong-lanceolate, glabrous, 7-15 cm. long, the pinnae short, barely denticulate, abruptly acute, 12-22 mm. long; sori 2-2.5 mm. across, midway between midvein and margin. (P. hesperium Maxon).

Occasional on rock ledges and in crevices on often steep rock faces; ~~somewhat variable over its range though among the several components of this~~ our form of this variable cosmopolitan species is more than ordinarily constant. Priest R. drainage, Epling 6532; St. Joe R., Epling & Putnam 10309.

3. Athyrium Roth.

Finely dissected ferns with usually thin, even highly membranous, green fronds borne in somewhat vase-like clumps upon an often stout scaly rootcrown. Sori various, prevalently curving in outline, ~~e~~ now horseshoe-shaped, now rounded, with or without an indusium, sometimes crossing to the outer or lower side of the fruiting veinlet.

0 Indusium wanting or practically so, the sporangia uncovered;

4 sori roundish; pinnae deltoid-lanceolate 1. A. americanum

0 Indusium present (often early deciduous in the lower parts but

4 { persistent near frond tip), more or less curving in outline;
  { sori short-lunate; pinnae oblong-lanceolate 2. A. filix-foemina

1. A. americanum (Butters) Maxon. Alpine Lady Fern. Ferns of strict erect habit, the fronds commonly somewhat folded lengthwise, light green with a brownish tone due to the abundant small fruit dots visible by the upturned made blades; blades narrowly lanceolate to lance-ovate, 15-40 cm. long, the pinnae deltoid-lanceolate, 3-5 cm. long, all rather close-set, the upper decreasing gradually in size to the acute frond tip, the ultimate pinnules incised and toothed; sori without an indusium, or indusium evanescent and very minute. (A. alpestre var. americanum Butters).

Talus scree, bare rock ledges and alpine rivulets, 5800-7000 feet, rare with us but colonial where present. Revett Lake, Epling et al. 10120; Mt. Pend Oreille, Christ 1213; Scurvy Mt., Kirkwood 1956.

2. A. filix-foemina (L.) Roth. Lady Fern. Tall leafy ferns with fistulous straw-colored somewhat sulcate stipes and rachises, 0.5-1.5 m. tall; fronds erect or ascending, thin-membranous, the blades lanceolate to broadly so, tapering about evenly at both ends, the lower pinnae sometimes quite distant, alternate throughout, the principal pinnae lanceolate, 10-20 cm. long, pinnate and again toothed, the teeth fine, spinulose, directed forward; sori about 1 mm. across, about midway between midvein and margin, the indusium early deciduous to expose the abundant brown sporangia.

Common throughout our region, in swamps, moist woods and about springs at middle elevations, sometimes forming lush clumps.

~~to a clump.~~

A. cyclosorum Rupr. Larger, the fronds 30-40 cm. wide; sori curving as to appear circular in outline, with a narrow sinus. Certain specimens (Thatuna Hills, Epling & Houck 9022) seem to represent this species, which to be sure, has been accepted by some field botanists (e.g. Piper and Frye) and discarded by others as merely a form of the widespread A. filix-foemina, "from which it appears amply distinct."

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4. Cheilanthes Sw.

Commonly xerophytic, shallowly rooted ferns of caespitose habit, the stipes and rachises chestnut-shining, brittle, the old bases persistent upon the often dense rootcrown. Fronds of varied aspect, usually compound, chaffy or hairy. Indusium formed of the reflexed pinnule margins, the sori either roundish, free or confluent, borne on the thickened tips of the free veins.

- Blades tomentose beneath, at first scant-webby above,
  - glabrescent, bipinnate — 1. C. gracillima
- Blades glabrous, closely tripinnate — 2. C. siliquosa

1. C. gracillima D. C. Eat. Lace Fern. Tufted xerophyte, the fronds numerous, erect, densely crowded, ~~wiry~~ the ~~old~~ broken stipes of past persistent seasons on the matted rootcrown, the blades bipinnate, elongated, narrowly oblong-lanceolate, 5-10 cm. long, lightly hairy above at first, becoming green and glabrous, permanently tomentose beneath with abundant brown scale-like hairs, the rachis chaffy with similar but longer scale-like hairs, the stipes puberulent and lightly glandular at base; indusium continuous around the segment, the sori confluent.

Rare in our region, in rock crevices. Hughes Mdw., Warren 302; Revett Lake, 6000 ft., Epling et al. 10177.

2. C. siliquosa Maxon. Loosely tufted fern with chestnut-shining stipes from ~~erect coarse, like fronds upon~~ a somewhat matted rootcrown, the fronds tripinnate, rather long-stalked, the blades more or less deltoid or ovate-deltoid, glabrous throughout, 3-5 cm. long, the pinnae with more or less reflexed margins, their edges thinner, erosulate and partially covering the sporangia to form the indusium, the fertile fronds thus with thickened subterete ultimate segments. (Onychium densum Brach.; C. densa St. John, not J. Fee.)

Infrequent, on rock ledges. Upper Priest R., 3000 ft., Epling 6562; Roman Nose Mt., Epling.

5. Pteridium Gled. ex Scop. Bracken.

Coarse fern from strong subterranean creeping and repeatedly-branched rhizome, bearing large subcoriaceous fronds alternately on the rhizome, the blades tripinnate, the 3 divisions bipinnate with narrow sublinear segments, the margins revolute; sori marginal, continuous; indusia of two kinds, the outer being inrolled margin of the segments, the inner variable from a continuous membrane to a broken membrane or merely a few hairs. A single worldwide species, of all temperate and tropical regions.

1. P. aquilinum var. pubescens. Underw. Fronds 1.5-2.5 m. tall, from a stout stipe, fuscous at base, straw-colored and sulcate above, shorter than the blade, the blade usually 0.5-1.0 m. long, ovate-triangular; rachis scantily pubescent with few scattered short curling hairs or glabrous; pinnae and pinnules subacute to obtuse, the pinnules at right angles or less often oblique to the midnerve of the pinna, the midnerve of pinnule distinctly pubescent; ultimate segments slightly to quite pubescent above, usually densely beneath and somewhat pubescent along the margins; indusia ciliate.

Common, at least locally, in the yellow pine association. Apparently not a potential menace to stock-raiser here, ~~however~~ as in Washington. ~~Stock~~.

6. Cryptogramma R. Br. Rock Brake.

Ours attractive tufted ferns of rock crevices and ledges, the fronds erect, dimorphic, those of the previous season forming a mat on the crown of the dense rootstock; sterile fronds triangular-ovate, the blades bipinnate, concolorous, the ultimate segments ovate, crenulate and bluntish, fertile fronds central, surpassing the sterile, the ultimate divisions narrowly lanceolate or linear, revolute, the margins inrolling to partially cover the brown continuous sori.

1. C. crispa var. acrostichoides (R. Br.) C. B. Clarke. Parsley Fern. Tufts 15-20 or 30 cm. tall, the sterile blades parsley-like, green, somewhat spreading, the fertile blades golden-brown from the abundant confluent sori, strictly erect; ultimate segments of fertile blades 6-12 mm. long, thickened or subterete in cross-section. (C. acrostichoides R. Br.).

Frequent on dry scree or rock outcrops to wet cliff faces, 3000-6500 feet. It is ~~commonly~~ the prevalent fern in this habitat.

7. Adiantum (Tourn.) L. Maiden-hair.

Comely ferns of graceful aspect, and commonly delicate submembranous fronds, with slender rootstocks and borne upon tough but very slender dark mahogany stipes, the fronds of ours dichotomous, the two divisions with 4-7 pinnately compound pinnae, the pinnules oblique, rhomboidal, more or less deeply lacerate on the distal margin, this margin inrolled in the fertile fronds to form the false marginal indusia, the proximal margin firm, entire, the pinnules rounded and erosulate at their tips.

1. A. pedatum var. aleuticum Rupr. Graceful ferns of distinctive aspect, 10-50 cm. tall, arising from scaly running rootstocks, the blades pedate-semicircular, spreading, 12-35 cm. wide, the pinnae 10-25 cm. long, varying within a single colony and with the seasons, the pinnules lunate-oblong, now obtuse or rounded, now acute to a sharp tip, truncate at the base 12-22 mm. long; sori short lunate or outermost even horse-shoe-shaped with a nearly closed sinus.

Occasional, sometimes very localized, in deep woods along streams at lower elevations. This fern is highly variable in outline of its pinnules, the being now broadly oblong and perfectly rhomboidal, now narrowly oblong and strongly arcuate, and either obtuse or distinctly triangular-acute. The last condition seems to obtain with early season or otherwise non-optimal times in the maturation of the fronds. This deserves more attention.

8. Dryopteris Adans.

Leafy large-fronded ferns, the blades bipinnate to tripinnate, the pinnae symmetrically reduced upwards, all the pinnules toothed, commonly with acute, spinulose or bluntish teeth. Sori roundish, covered by commonly cordate-reniform or horseshoe-shaped indusia, the indusia prevailingly firm, chartaceou and persistent, and attached by the center or sinus. (Aspidium Swz.; Thelypteri Schmidel) ~~the above generic name conserved by Intern. Rules Bot. Nomencl.~~

2 Pinnae approximate; indusia somewhat glandular — 1. D. dilatata

2 Pinnae distant; indusia glandless

3 Sori equally distributed over pinnae — 2. D. spinulosa

3 Sori confined to basal half of pinnae — 3. D. filix-mas

, its fronds 1. D. dilatata (Hoffm.) A. Gray. Handsome fern of broadly deltoid-lanceolat outline, of rather thin-membranous texture, arising from a moderately stout rhizome, the stipes conspicuously scaly with dark brown hyaline chaff, the rachises much less so; blades tripinnate, 2.5-3.5 dm. long, the pinnae approximate upon the rachis, 10-14 cm. long, the basal pair unlike the upper in their oblique outline, the lower pinnules 7 cm. long, much longer than the corresponding upper ones 2.5-3 cm. long, the lower pinnatifid, the ultimate segments serrulate with spinulose teeth; sori fewer, the indusia indistinctly glandular-ciliolate.

Occasional, in moist wooded bottomlands.

2. D. spinulosa (O. F. Müll.) Watt. Shield Fern. Medium-sized fern from stout rhizomes, the stipes with a few scattered pale hyaline scales, the rachises even less chaffy; blades bipinnate, 4 dm. long, the pinnae distant, not crowded, elongated-triangular, a little oblique to the rachis, pinnatifid or lowermost nearly completely pinnate, the pinnules serrulate, 10-15 mm. (the lowermost of 2 basal pinnae much longer, 23-25 mm.) long, the acute-angled sinuses open, teeth spinulose; sori submarginal, indusium glandless, rather early deciduous.

Rare, in rich woods, known only from Orogrande Cr., 3000 ft., Epling & Houck 9349. This is the most northwestern station for this Eastern fern.

3. D. filix-mas (L.) Schott. Male Fern. Tall strong, rather coarse-fronded fern, arising from a stout scaly rhizome, stipes and rachises straw-colored, the fronds 3-11 dm. long, lanceolate in outline, bipinnate, the pinnae usually a little distant from each other, oblong-lanceolate, acuminate to a somewhat caudate tip, pinnatifid or the lowermost completely pinnate, 10-16 cm. long, the pinnules short-oblong, 12-16 mm. long, serrulate, the sinuses of the teeth narrow, closed; sori confined to proximal half of each pinnule, in 2 more or less regular rows, nutmeg-brown, nearer the midvein than the margin; indusia orbicular, attached by the short closed sinus.

Damp shady woods and spring seeps, common at middle elevations.

9. Cystopteris Bernh. Bladder Fern.

Delicate membranous fern, the stipes slender, weakly chaffy, arising from a matted rootstock; blades bipinnate or tripinnate, the segments toothed; sori roundish, covered by a membranous bladder-like indusium which drys away to a persistent attachment at one side of the sorus. ——→

not → Easily confused with Woodsia, from which it differs importantly in indusium characters, and from which it also differs in its thinner-textured more filmy fronds which are always glandless.

1. C. fragilis (L.) Bernh. Fronds variable, mostly lanceolate, the basal pinnae distant, the upper uniformly ~~reduced~~ to the acute tip; pinnae pinnate or pinnatifid, lanceolate, 18-30 mm. long, the pinnules serrulate at apex at least, with acute teeth, often obscured by the abundant closely-massed more or less confluent sori, which often extend to margins from a 2-rowed submarginal position; indusia rather early deciduous except at tip of blades, the blades wholly glabrous or with a few scattered hairs on the dorsal surface. (Filix fragilis (L.) Gilib.).

Our most common fern, growing on a wide variety of soils in several habitats at chiefly middle elevations. Individuals may be distinguished as sun forms by their densely soriferous fronds, which then simulate the more xeric forms of Woodsia.

10. Polystichum Roth.

Coarse commonly bristly simply pinnate to tripinnate ferns with markedly chaffy stipes arising from conspicuously chaffy stout rootstocks. Sori roundish with centrally attached peltate firm indusia.

0 Fronds bipinnate — 1. P. Andersoni

0 Fronds pinnate

2 Principal pinnae short falcate-lanceolate, the lowermost rounded or deltoid, thus wholly unlike the upper — 2. P. lonchitis

2 Principal pinnae long falcate-lanceolate, the lowermost not essentially unlike the upper, simply reduced — 3. P. munitum

1. P. Andersoni Hopkins. Slender ferns resembling but the stipes and Dryopteris rachises chaffy with slender often hair-like light-brown scales, blades bipinnate, strongly bifacial, the upper surface dark-green, paler beneath, 4-5 cm. long, the pinnae lanceolate to an acute tip, the principal pinnae 4.5-5.5 cm. long, pinnate, the pinnules short-oblong, bluntish, scarcely auriculate, diminishing gradually from rachis to the merely lobed apex, denticulate with bristle-tipped teeth; sori somewhat confluent, along the midvein, never densely covering the pinnules.

Rare, known with us only from deep woods, Hughes Fk., Boundary Co., Warren 317.

2. P. Lonchitis (L.) Roth. Holly Fern. Trim ferns, the fronds lanceolate, the stipes short, arising from a heavy chaffy rootstock, densely crowded with bases of old stipes; blades elongate- or scimitar-lanceolate, 2.5-5 dm. long, the pinnae closely approximate, auricled, the principal ones shortly arcuate-lanceolate, 2-3.5 cm. long, the basal deltoid to suborbicular, 8-12 mm. long, all pungently serrate with bristle-tipped teeth; sori in 2 rows, or confluent in a submarginal line, indusia rather inconspicuous.

Occasional, on steep canyonsides, rock ledges or open ridges, from 3500-6500 ft. Of variable stature, with dwarfish sun and symmetrical shade forms.

3. P. munitum (Kaulf.) Presl. Western Sword Fern. Rather coarse evergreen fern with abundant lanceolate chestnut-brown scales on stipes and rachises, the fronds pinnate, dark green above, lighter beneath, the stipes 8-12 cm. long, the blades lanceolate, acuminate to a slender tail-like tip, 30-45 cm. long, 9-16 cm. wide, the pinnae evenly set, alternate upon the rachis, auriculate, narrowly lanceolate, now nearly straight, now falcate, 4-9 cm. long, serrulate with short appressed bristle-tipped teeth; sori in 2 rows, 1.0-1.5 mm. wide, submarginal or confluent, especially in sun forms, the indusia roundish, fringed, irregularly tardily deciduous.

Occasional in woods, forming stools of few to several erect or ascending fronds, 2500-4000 ft., being a species which enters our area from the coastal region. The fronds are extensively harvested in coastal Washington for the florist trade.

11. Woodsia R. Br.

Caespitose ferns of slender erect rather stiffish habit, the fronds pinnate, lanceolate or lance-ovate, the pinnae commonly pinnatifid into fine-toothed segments; sori round, small, the indusia thin, early withering, ours with delicate marginal curling hairs.

Blades and stipes both hairy and finely glandular; pinnae oblong-ovate, spreading at nearly or quite right angles to the rachis — 1. W. scopulina

Blades and stipes smooth or, if finely hairy, not at all glandular; pinnae triangular-oblong, acute, obliquely ascending away from the rahcis — 2. W. oregana

1. W. scopulina D. C. Eat. Rather stiffly ascending fern arising from a tufted chaffy dense rootcrown, the stipes shining chestnut-brown, darkest below, the rachises straw-colored, minutely glandular-hairy, especially distally, the blades lanceolate, 8-12 cm. long, the pinnae oblong-ovate, approximate, 12-20 mm. long, pinnatifid into sinuate or lobed divisions, glandular-hairy on both surfaces, the sori indistinct, crowded, submarginal, irregular or roundish, the indusia resembling a diminutive doily with a fringe of curling hairs.

tr. Next to Cystopteris fragilis our most common fern, favoring moist rock crevices or ledges, at middle elevations. From that species → it may be distinguished at all stages of development by the glandular-hairy character of its blades. It has a distinctly thicker texture and more rigid habit as well.

2. W. oregana D. C. Eat. Rather more delicate fern than the last, the stipes and fronds glandless, arising from a tufted chaffy dense rootcrown, the stipes shining pale or chestnut-brown, the upper stipes and rachises straw-colored, seldom scantily hairy, never glandular, the blades narrowly lanceolate, 4.5-10 cm. long, the pinnae triangular-oblong, abruptly narrowed to the acute tip, all more or less distant, especially below, 5-12 mm. long, pinnatifid into irregularly-or sinuately-lobed divisions, glabrous, the marg sometimes slightly inrolling toward the indistinct roundish sori, the indusia difficult to locate, minute, early deciduous, ciliate with few hairs.

Infrequent, in rock crevices at lower elevations, ~~a more delicate fragile fern than W. scopulina~~, Roman Nose Mt., Epling; Lewiston Hill, Hitchcock & Samuel 2516.

B. Spermatophyta. Seed Plants.

Terrestrial or aquatic plants usually with green foliage, extremely varied in habit, ranging from tall trees to minute herbs, usually with aerial stems. As in the ferns reproduction is indirectly accomplished by spores which are of two kinds, the microspores (pollen) being produced within the stamens which are considered to be modified leaves, the single megaspore being formed within a structure termed the ovule which it never leaves. The ovules are produced either upon the surface of modified leaves (in the gymnosperms) which are usually assembled into a cone, or are produced within the cavity formed by the union of one or more modified leaves termed the pistil (in the angiosperms). The stamens and pistil or pistils are assembled variously into a structure known as the flower, which (in the angiosperms) is commonly surrounded by one or two series of modified leaves termed the calyx and corolla. The extremely varied arrangement of the parts of the flower and the nature of the seed and fruit are the bases of classification.

1. Gymnospermae. Gymnosperms.

Trees or less frequently shrubs in which the ovules and seeds are not surrounded by an ovary wall but are borne naked at anthesis on the flat surface or more or less modified sporophylls which, with one exception in our region, are formed into cones of various sizes and shapes, and more or less woody at maturity; commonly known as needle- or cone-bearing trees. The fruit of Taxus is a red cherry-like structure; that of Juniperus a modified cone with fleshy scales which have grown together in such a way as to resemble a berry. Cotyledons 2-many, usually variable.

Key to the Seedlings of the more common Gymnosperms.

0 Cotyledons constantly 2,

2 Cotyledons flat, 15-20 mm. long, 2 mm. wide, dark green but dull, tapering toward the apex, persistent the second year; first leaves similar to mature foliage but thinner and smaller; seedlings 3-4 cm. tall. — 6 — 2 — Taxus brevifolia

2 Cotyledons flat, 5-7 mm. long, rounded at the apex, narrowed below the middle, green; first leaves in whorls of 3-4, 4-5 mm. long, soon reflexed; seedlings 1-2 cm. tall. — 6 — Thuja plicata

0 Cotyledons 3-12, rarely ever 2

2 Cotyledons distinctly triangular in cross-section.

4 Cotyledons 1 cm. long or less, less than 1 mm. in diameter, green; first leaves 6-8 mm. long, slender, acute, tipped with a translucent mucro, light green, their margins minutely and sparingly serrulate, the teeth tipped with glands, jointed .5 mm. above the base, decurrent below the joint, the new growth of the stem whitish; seedlings 1-2 cm. tall. — 8 — Picea Engelmannii

4 Cotyledons 1.5 2-5 cm. long. — 6 — Cotyledons commonly 6-10

8 Hypocotyls green, cotyledons 2-2.5 cm. long, 1 mm. wide or less, light green and rather glaucous, commonly 6-10, withered but often persistent the second year, very acute, minutely and sparingly glandular, ciliolate toward the base; first leaves about 1 cm. long, rather flat, acute, the margins minutely toothed; seedlings 4-5 cm. tall. — commonly — 12 — Pinus monticola

8 Hypocotyls brown, longitudinally striate;
12 cotyledons 2.5-5 cm. long

tr. 10 Cotyledons 2.5-3 cm. long, mostly 8-10, 1-1.5 mm. wide, tapering, acute, the margins entire, light green but hardly glaucous; first leaves 1-1.5 cm. long, finely toothed along the margins, rather glaucous; seedlings 5-6 cm. tall. — 14 — Pinus albicaulis

10 Cotyledons 4.5-5 cm. long, mostly 8-10, 1-1.5 mm. wide, tapering, acute, the margins entire, light green but hardly glaucous; first leaves 2-2.5 cm. long, finely toothed along the margins, rather glaucous; seedlings 6-8 cm. tall. — Pinus ponderosa / Pinus contorta

14

6 Cotyledons 3-7, commonly 4 ~~Cotyledons 3-7, commonly 4~~>

2 Cotyledons flat but commonly bearing a ridge 6 along the middle on the upper surface

4 Cotyledons bearing minute white dots on the upper surface which is ridged along the middle, 1.5-2.5 cm. long, 1.5-2 mm. wide, blunt, entire, usually 4 or 5, less often 3 or 6; first leaves 8-10 mm; long, white on the lower surface; seedlings 3-5 cm. tall; hypocotyls red. — Tsuga mertensiana

8

4 Cotyledons green and rather glossy on 8 the upper surface.

6 Primary stem distinctly white, the cotyledons ridged along the middle on the upper surface, commonly 5-6, very slender and acute; first leaves less than 1.5 cm. long, flat, tipped with a hyaline mucro, the lower surface white-dotted, the margins appearing translucent when held to the light, the midvein very dark; seedlings 3-4 cm. tall — Larix occidentalis

10

6 Primary stem not white

8 Cotyledons 6-7 mm. long, 1 mm. wide, 3-4, narrowed at the apex but rather blunt, the first leaves alternate, but appearing whorled, blunt at the apex, their margins minutely serrulate, the teeth glandular-tipped, swollen and jointed at the base; primary stems puberulent; seedlings 1-2 cm. tall — Tsuga heterophylla

12

8 Cotyledons 1.5-2 cm. long, 3-12
10 Cotyledons 6-12
12 First leaves tipped with a hyaline mucro; cotyledons 6-9, persistent to the second year, 1.5-2 cm. long, 1.5 mm. wide, rather glossy, acute, the midvein visible but not prominent; first leaves 1-1.5 cm. long; seedlings 3-4 cm. tall — 16 — Pseudotsuga taxifolia

12 First leaves blunt or even notched; cotyledons usually 6-7, persistent to the second year, about 2 cm. long, 1.5-2 mm. wide, narrowed at the apex but blunt, glossy above, the midvein prominent, more or less white-dotted on the lower surface; first leaves 1-1.5 cm. long, flat and glossy, usually narrowed toward the base — 16 — Abies grandis

Cotyledons 3-5, usually 4 — Abies lasiocarpa

~~Pinus ponderosa~~

~~Juniperus occidentalis~~

~~Juniperus communis~~

~~Larix Lyallii~~

Taxaceae. Yew Family.

Trees or shrubs with evergreen linear leaves; cones of two kinds; staminate and ovulate, axillary, borne on the same or on separate plants, both subtended by a cluster of scales, the ovulate cone consisting of a single erect ovule which at maturity forms a bony seed surrounded by a fleshy cup-like aril. Cotyledons 2.

1. Taxus (Tourn.) L. Yew.

Small trees or shrubs, treelike or sprawling, with scaly bark and flat, pointed needles, spirally arranged, but which, due to a twist at the base appear as intwo ranks. Staminate cones globose, on a short stalk, the stamens several, the anthers pendant in a ring about the filament; ovulate cones inconspicuous, green, forming at maturity a bright red, pulpy, cherry-like fruit, the seeds bony.

Western Yew

Taxus brevifolia Nutt. A sprawling shrub, rarely [illegible] a small tree 5-6 m. tall with an ovoid crown, stems 10-12 cm. [illegible] ascendent, decumbent or even prostrate, forming [illegible] tangles; young bark reddish-drab with a dull lustre, smooth, mature bark similar in shade often with a violaceous tinge, irregularly flaking away; branchlets green, glabrous, striate from the decurrent leaf-bases; leaves persistent 5-7 years, commonly 1.5 cm. long, 2.5 mm. wide, flat, narrowly oblong, narrowed at the base, acuminate at the apex with a short, sharp mucro, dull green above, the midvein elevated, paler and yellowish green beneath, twisted at the base and obscurely articulate, spreading in flat apparently two-ranked sprays, which when young are bluish green, very glaucous; staminate cones yellowish, in globose clusters 2-3 mm. in diameter on peduncles of equal length; ovules glaucous, green, 2.5 mm. long, scarcely exceeding the scales; fruit a bright coral-red, translucent, cherry-like structure 8-10 mm. in diameter, the seed about 8 mm. long, elliptical, bony. Seedlings 3-4 cm. tall; cotyledons two, flat, 15-20 mm. long, 2 mm. wide, dark green but dull, tapering toward the apex; first leaves similar to mature leaves but smaller and thinner, decurrent, cotyledons persistent the second year.

Mostly in mature shaded cedar-hemlock associations below 4000 feet, solitary or forming thickets, sometimes surviving in open burns when not fire-killed; observed as high as 5000 feet in the Clearwater forest.

Pinaceae. Pine Family.

Evergreen trees (except Larix) ~~or a shrub (Juniperus communis)~~ with needle-like ~~or scale-like~~ leaves arranged spirally ~~or opposite~~. Staminate and ovulate cones usually borne on the same plant, emerging from clusters of scales which persist at the base, catkin-like or cone-like in form, the staminate soon withering and falling, the ovulate forming woody ~~or in some cases, rather fleshy~~ cones which mature in the same or second year, or occasionally in the third. Stamens with two pollen sacs; megasporophylls with two ovules. Seeds commonly winged. Cotyledons several.

0 Leaves mostly 3-angled, in clusters of 2-5, the cluster surrounded at the base by a scarious sheath during the first year; branches in whorls; cones maturing in either two or three seasons. 1. Pinus

0 Leaves mostly flat, solitary; cones maturing in one season

2 Leaves chiefly borne in tufts of 20-40 on stubby lateral branchlets, pale green, deciduous each year; cone scales sub-tended by a conspicuous tailed bract. 2. Larix

2 Leaves not in tufts, persistent for several years

4 Leaves ~~rhombic~~ 4-angled in cross section, curving, prickly, leaving a persistent peg-like base nearly 1 mm. long when shed, cones pendulous; cone scales thin and more or less eroded toward the tips; bark scaly. 3. Picea

4 Leaves triangular or flat, but with a groove down the middle, acute or blunt but not prickly; if a base is left by the needle it is closely adherent to the branchlet; bark furrow-ed or smooth but not scaly.

6 Leaves bluntly attached, not decurrent along the branchlet, leaving a circular scar when shed.

2 Leaves bluntly pointed, soft, the branchlets gracefully pendulous; bark furrowed, yellowish within, cones pendent, the scales subtended by a conspicuous tailed bract 4. Pseudotsuga

8 Leaves blunt at the apex, often notched,
branchlets spreading or curving upwards,
rigid, not pendulous; bark furrowed only
when trees are 40-50 cm. in diameter or
not at all, reddish within; cones erect
stubby, the bracts hidden by the scales — 5. Abies

6 Leaves decurrent on the branchlets, leaving a short
10 base when shed; cones pendent — 6. Tsuga

1. Pinus (Tourn.)L. Pine.

Trees, ~~in our region,~~ with whorled branches and two kinds of needles, the primary needles solitary, alternate, the secondary borne in the axils of the primary leaves and forming the ordinary foliage, in fascicles of 2-5, each fascicle surrounded at the base by a series of scarious bracts which may or may not be deciduous at the end of the first season. Needles persistent for several years. Staminate and ovulate cones usually borne on separate branches of the same tree, the former clustered at the base of the season's growth, more or less cylindrical, composed of a spiral series of 2-chambered stamens, subtended by an involucre of chaffy bracts, the latter usually lateral, solitary or several, composed of a spiral series of fertile sporophylls (scales), each bearing two ovules on the upper surface, each subtended by an inconspicuous bract; fruit greatly enlarged, forming a woody cone, usually not maturing until the second, sometimes, the third season, ~~and~~ persistent on the tree for several years in some species; scales thickened and rigid, the tip variously modified by a boss bearing a prickle in some species. Seeds winged, shed at maturity of cone or in some species retained in the unopened cone for several years. Cotyledons 3-angled, several.

~~Key to the Species.~~

1 Needles in clusters of five; cone scales without a recurved or spreading prickle.

2 Needles less than 1 mm. in diameter, the cluster hardly 2 mm. in diameter, the margins of the needles smooth, the stomatal lines on the upper surface not conspicuous; cones ovate, not pendulous, 4-8 cm. long. 1. P. albicaulis

2 Needles slightly more than 1 mm. in diameter, the cluster nearly 3 mm. in diameter, the margins of the needles minutely toothed under a lens, rough to the touch, the 2-4 lines of stomata on the upper surface white and conspicuous; cones cylindrical, pendulous, 15-20 cm. long. 2. P. monticola

1 Needles in clusters of 2-4; cone scales armed with a short prickle.

2 Needles in clusters of 2, hemispherical in cross-section; cones 4-5 cm. long. 3. P. contorta

2 Needles in clusters of 3 (sometimes 4), 3-angled; cones 7-12 cm. long. 4. P. ponderosa

L. P. albicaulis Engelm. → White-bark Pine. ——→ Commonly a small tree confined to high ridges in our region, in favorable situations reaching a D.B.H. of 5-6 dcm., more commonly 2-3 dcm., 20-25 m. tall, the trunk and lower branches then massive in proportion, tapering; branches spreading, branchlets somewhat woolly, crown more or less ovoid and obtuse; young bark smooth, light grey or ashy, rather dull, the mature bark, 1 cm. or less thick, scaly, the flakes thin, 2-4 cm. in diam[illegible], the inner bark brownish; foliage yellowish green, leaves tufted at the ends of the branches, [illegible] 5 in the cluster, scales sheathing the needles for about 1.5 cm. but soon deciduous, leaving the cluster naked; needles 4-6 cm. long, about 1.2 mm. thick, triangular in outline, green, persistent 6-8 years, the margins smooth, stomata inconspicuous, the apex blunt; staminate cones bright purple, in axillary clusters just below the most recent cluster of leaves, about 1 cm. long, ovoid, the scales rounded, half the length of the catkin; stamens 2 mm. long, the tip triangular; ovulate cones borne near the apex, about 1 cm. long, oval, bright purple and somewhat glandular in flower, 4-8 cm. long at maturity, sessile, ovate, the scales closely pressed together, never spreading widely, purplish, subrotund, 1.5-2 cm. long, 6-8 mm. thick, shortly acuminate, the callous impressed; seeds 6-9 mm. long, the wing narrow, remaining attached to the scale. Seedling 5-6 cm. tall, the hypocotyl light brown, cotyledons 8-10, triangular in cross-section, 2.5-3 cm. long, 1-1.5 mm. wide, tapering, acute, entire; first leaves 1-1.5 cm. long, finely toothed along the margin, rather glaucous.

Ridges, mostly above 6000 ft., where it occasionally forms an open forest in pure stand or associated with Tsuga Mertensiana or Abies lasiocarpa, occasionally descending cool slopes as low as 5000 ft., when often occurring with Pinus monticola from which it may be distinguished by the coarser needle which is smooth on the edges. Young trees may occur as low as 2500 feet but this is unusual.

2. P. monticola Dougl. ——>Western White Pine. ——>A stately forest tree of great beauty, 30-50 m. tall, characterized by the glaucous blue-green foliage and erect, columnar shaft. Trunk of mature trees with very slight taper, very straight, and under ordinary forest conditions are pruned of branches for 50-60 feet; D.B.H. commonly 1 m., rarely as much as 2 m. in old trees. Branchlets slender, reddish brown, somewhat roughened by the leaf bases; young bark grey, very smooth, dully shining, lenticles few and inconspicuous, resin pockets frequent, checking longitudinally at about 25-30 years, becoming darker, with a pepper and salt aspect, infrequently somewhat scaly, suggesting the bark of P. contorta, the mature bark 2.5-3.5 cm. thick, grey with a reddish tint, broken into small rectangular plates 5 cm. x 8 cm., the fissures rarely 1.5 cm. deep, brownish. Crown oblong, rather obtuse, rounded in old trees, the branches horizontal but drooping somewhat, of characteristic aspect at a distance by reason the spacing between whorls. Foliage glaucous with a bluish tint, the needles 5 per cluster, deciduous by the third or fourth year, very fine and pliant, 6-8 cm. long, scarcely 1-1.5 mm. wide, glaucous, 3-angled, the margins minutely and sparsely toothed, apex acute but not mucronate, each flat inner surface bearing 2-4 lines of stomata; ~~scales~~ bracts quickly deciduous leaving the base naked. Ovulate cones borne in the apex of the crown, 15 mm. long, in flower, purple, cylindrical, the scales suborbicular, becoming green or dark purple before opening, pendulous on a short stalk at maturity, rarely persistent on the tree after maturity, 15-20 cm. long, cylindrical, tapering at both ends, the scales 3-4 cm. long, oblong or oblong-obovate, mahogany-colored within, the tip clay-colored, smooth, polished, the umbo inconspicuous, apical, commonly with a resin drop; seeds 5-7 mm. long, the wing oblong, 18-20 mm. long, shining. Seedlings 4-5 cm. tall, light green and rather glaucous, cotyledons triangular in cross-section, 6-10, withered but often persistent the second year, 2-2.5 cm. long, 1 mm. or less wide, very acute, minutely and sparsely glandular, ciliolate toward the base; first leaves about 1 cm. long, rather flat, acute, the margins minutely toothed, the first fascicles appearing in the axils of these, 2-3 cm. long.

Reaches its greatest development on moist northerly slopes and flats from 2500-4500 feet, but has been observed as high as 6200 feet associated with Tsuga Mertensiana, Abies lasiocarpa and Pinus albicaulis. In the early life of the forest is associated especially with Larix occidentalis and Pinus contorta. As the forest approaches maturity, it is associated more commonly with Abies grandis, Pseudotsuga ~~macrocarpa~~ taxifolia, Tsuga heterophylla and Thuja plicata but yields gradually to the two latter species. Is the most valuable commercial tree of our region. Bears cones as young as 14-16 years, usually not earlier than 20-25 years.

1. Pinus contorta Dougl. ——→ Lodgepole Pine. ——→ A short lived stiffish tree, ~~commonly~~ 5-6 m. tall, and 8-10 cm. in diam, ~~occasionally~~ 18-20 m. tall, D.B.H. 30-40 cm., the trunk then slender with a slight taper, the branches pruned for about two-thirds its length, commonly spreading and more or less horizontal, but curving strongly at the ends; branchlets light brown, becoming grey, scurfy, marked by the needle scars; young bark dull grey, scurfy, mature bark dark grey, rarely over 1.5 cm. thick, scaly, uneven and rough, the flakes 2-3 cm. in diameter, easily detached, the margins strongly curved upwards, the basal bark dark, frequently deeply fissured, with cross fissures forming small rectangular plates; crown, when unaffected by neighboring trees, ovate, dense, often extending to the ground, obtuse, foliage yellowish-green en masse, needles persistent 6-8 years, 2 in a bundle, 4-6 cm. long, stout and rather rigid, acute, the margins rough, the base of the fascicle tightly wrapped with scales, fragments of these more or less persistent, cross-section hemispherical; staminate cones red or yellow, 12-18 mm. long, cylindrical, borne on spikes 2-10 cm. long throughout the crown; ovulate cones borne throughout the crown, about 1 cm. long in flower, very prickly, ovate or oblong-ovate at maturity, 4-5 cm. long, the uppermost scales tuberculate, the boss pyramidal, armed with an acute, slender prickle 2-3 mm. long, maturing in August or September of the second year, but persistent for several or many years, often retaining their seeds for long periods, ovate to subglobose when expanded; seeds 3-4 mm. long, blackish, the wing oblong, 10-12 mm. long, 3-4.5 mm. wide.

Cotyledons 3-7, commonly 4, 1.5-2 cm. long, green, tapering, acute, triangular in cross-section, their margins entire; first leaves more flattened and less acute than cotyledons, their margins finely serrulate. (P. contorta var. latifolia Engelm.).

Ubiquitous at all elevations where competition is slight, frequently forming pure dense stands, especially in twice or severely burned areas, due to the short juvenile period which may be as low as 8 years, With Larix occidentalis is an early entrant in most burns, apparently forming taxifoli a nurse crop for Pinus monticola and Pseudotsuga ~~mucronata~~. Rarely reproduces itself in situ in northern Idaho, but is gradually replaced by other conifers of the region except Taxus and Juniperus. Is tolerant of a very wide range of climatic and ecologic conditions, and may occasionally be found in sphagnum bogs associated with Betula pumila.

Douglas

P. ponderosa ~~Lawson~~. ——→ Western Yellow Pine. ——→ A massive, striking tree ~~occurring in open stands~~, ~~80-150 feet~~ 30-50 m. tall, ~~characterized by~~ with bright cinnamon brown ~~color~~ mature bark and ~~the~~ long needles. Trunk of mature trees with a light but gradual taper, when in denser stands clear for about ~~50 feet~~ 50 feet; D.B.H. as much as 2 m. Branchlets reddish-brown, very rough from the leaf-bases, more or less scaly; young bark rather dark grey, rough and rather scurfy, marked by the needle scars, soon becoming fissured, reddish tinged, often scaly, the mature bark ~~[illegible]~~ 7-10 cm. thick, furrowed, the furrows black, dividing the bark into fairly regular plate 12-15 cm. broad, 60-100 cm. long; the surface ~~[illegible]~~ of small concave scales. Crown oblong, commonly persistent nearly to the base, the branches spreading but curving markedly at the ends, bearing dense tufts of foliage; ~~the~~ foliage yellowish green but dark, the needles deciduous about the third year, 3 (less commonly 4) per fascicle, 15-20 cm. long, 1.5-1.8 mm. wide, 3-angled, apex acute, the margins minutely toothed, the base closely sheathed, the scales more or less persistent. Staminate cones borne in clusters at the base of the new growth throughout the crown, purple, elongating to 2.5-5 cm. Ovulate cones borne throughout the crown, narrowly ovate before opening, sessile, spreading at right angles to the branch, 7-12 cm. long, ovate to oblong-ovate when opened, the scales rather thin, oblong-truncate and rounded at the apex, 2-3.5 cm. long, mahogany beneath, brown above, the umbo brown, sub-pyramidal, armed with a sharp mucro 1-2 mm. long; seeds 6-7 mm. long, dull brown, the wing wedge-shaped, about 2 cm. long. The cones in falling leave a small tuft of basal scales on the branch and infrequently persist the year following maturity. Seedlings 6-8 cm. tall, the hypocotyls brown, striate; cotyledons 9-10, 4-5 cm. long; first leaves serrulate, glaucous 1.5-2.5 mm. long.

The climax tree of a narrow belt merging with the grassland. Rarely observed as high as 5500 feet and infrequent above 5500 feet. Found chiefly around the margins of the lakes or low, broad valleys, associated here especially with Pseudotsuga taxifolia and Larix occidentalis, and on flat ground at the edge of the grassland, associated here with Pinus contorta or forming pure open stands of small dimensions. Is frequent on the slopes of the Kootenai Valley, covering fairly extensive areas there, pure or with Pseudotsuga taxifolia.

2. Larix (Tourn.) Adans. Larch.

Trees with light green needle-like leaves, deciduous each year, those on first year wood alternate, decurrent, those on older wood borne in tufts of usually 15-40 on peg-like lateral twigs. Staminate and ovulate cones solitary, borne usually on the same branches of second year wood, the former subglobose, sessile, the anther sacs 2, the latter composed of spiral series of fertile sporophylls (scales), each bearing two ovules on the upper surface, each subtended by a conspicuous tailed bract; fruit greatly enlarged, forming a woody cone, maturing and opening in one season, sometimes persistent the second year, the scales thin, the bracts conspicuous, spreading; seeds winged. Cotyledons several.

~~Key to the Species~~

tr

0 → Branchlets densely woolly; rarely below 6000 ft. — 2. L. Lyallii

0 ← Branchlets glabrous; rarely above 6000 ft. — 1. L. occidentalis

with

1. L. occidentalis Nutt. → Western Larch. ——→ A straight, slender tree 30-50 m. tall, ~~Characteristically, the~~ light green, very thin foliage and yellowish bark; D.B.H. commonly 9-12 dcm., rarely 15 dcm. in our region, the butt expanded and protected by deeply furrowed bark several inches thick at the base; branches irregularly disposed, drooping slightly, the branchlets rigid or in some forms gracefully pendulous, pruned to 50-60 feet or more in closed stands; branchlets brown, soon gray, striate from the decurrent leaf bases, glabrous, young bark rather light grey, dull, marked with needle scars and adhering dwarf branchlets, soon becoming longitudinally fissured, fissures yellowish, shallow, net-like, often forming indistinct plates in age, mature bark with a flat yellowish or brown color; crown narrow, oblong, acute at the apex or rounded in old trees; ~~foliage light yellow green, thin, deciduous each year~~ → needles 2-3 cm. long, flat, but ridged on both surfaces, slender, acute but not mucronate, dull, a double line of stomata on each surface, decurrent on new growth, but chiefly borne on dwarf lateral branches, 7-8 mm. long, averaging about 25 in the tuft; anthers yellow, in flattened-globose clusters; mature ovulate cones borne chiefly in the upper half of the crown, 3-3.5 cm. long, about 2 cm. wide, oval, the scales soon spreading, about 8 mm. long, subrotund, more or less truncate at the apex, greenish, the bract oblong, brown, 6-7 mm. long, the wings oblong-lanceolate, 3-4 mm. long. Seedling 3-4 cm. tall, cotyledons 5-6, 1.5-1.8 cm. long, slender, acute, ridged above, flat beneath, new growth of stem white, leaves 1.5 cm. long, tipped with a hyaline mucro, flat, with two rows, each composed of 3-4 densely crowded lines of stomata, on the lower surface; by transmitted light the margin appears translucent and the midvein very dark and distinct; base somewhat expanded, leaving a small decurrent stump.

Typically developed in our region on subalpine flats and broad ridges above 5000 ft., forming small pure stands or more commonly associated with Abies lasiocarpa which slowly replaces it at least in part. On drier subalpine slopes is associated with Pseudotsuga taxifolia and Pinus contorta. Extends as low as 2500 feet along the margins of meadows, associated with Abies lasiocarpa. → St. John (1937) has taken up the segregate P. columbiana Lemmon for this tree.

Ranges from 2500 to 6200 feet or more. Is commonly associated with Pinus monticola or P. contorta in young growth or with Pseudotsuga taxifolia in Douglas fir types. It is persistent by reason of its ability to withstand fire, due to thick basal bark and is consequently often the only seed tree left after fire. Is a rapid growing tree of small shade tolerance and consequently is infrequent in the older stages of the forest.

2. L. Lyallii Parl.→Alpine Larch. ——→ A slender tree with resinous wood, 15-20 m. tall, as much as 1 m. D.B.H., the branches irregularly spreading, unequal in size in mature trees, often gnarled and contorted; branchlets rather reddish, woolly, becoming gray, tinged with brown below the leaf scars, longitudinally striate, the young bark lustrous, soon becoming scaly, resembling that of Picea, in mature trees shallowly fissured and broken into oblong plates 10-15 cm.long or more, the plates remaining more or less scaly; bud scales thin and membranous, white-woolly; leaves pale but bright green, soft and pliant, 3-4 cm. long, acute, smooth, 20-30 in each cluster normally, though as few as 8-9 in stunted forms, flattened-tetragonal in cross-section, a small oil duct along either margin; staminate cones 3-4 mm. long, pale yellow; ovulate cones ovate-oblong, with wine-red scales and glabrous bracts which are abruptly acuminate, 8-12 mm. long; mature cones narrowly ovate or cylindrical, 3-5 cm. long, 2-2.5 cm. thick when opened, sessile or nearly so, the scales orbicular, thinly pubescent; seeds 2.5-3 mm. long, their wings ovate-elliptical 5-6 mm. long.

Abundant on talus slopes near the summit of Roman Nose Mt., 6000-7000 ft., forming fairly pure stands; mature trees occur near the cirque lake, associated with Pinus albicaulis and Abies lasiocarpa, [redacted]. A specimen of 14 inches D.B.H. showed somewhat less than 400 annual rings.

3 Picea Link. Spruce.

Trees with needle-like leaves, alternate and spiral, spreading and curving upwards, 4-angled in our species, acute and stiff, decurrent and jointed at the base, persistent for several years, leaving a characteristic peg-like spreading base below the joint after being shed. The staminate and ovulate cones borne on the same tree on second year wood, terminal or axillary, the former cylindrical, formed of a spiral series of two-chambered stamens, subtended by an involucre of scales, the latter formed of a spiral series of fertile sporophylls (scales) each bearing two ovules on the upper surface, each subtended by an inconspicuous bract; fruit a more or less woody pendent cone, maturing the first year and deciduous in our species, the scales thin; seeds winged. Cotyledons several, 3-angled.

1. P. Engelmannii Engelm. → Engelmann Spruce. → A forest tree with a massive trunk tapering gradually, commonly 25-30 m. tall, characterized in our region by the sharp needles and scaly bark; D.B.H. rarely more than 1 m.; branches irregularly disposed, the lowermost drooping markedly, the branchlets more or less pendulous; branchlets tan color the first year, or straw- colored in new growth, glandular-puberulent, soon becoming dull gray and scurfy, marked by the persistent and prominent decurrent leaf bases; young bark very dull slate color, soon broken by tiny brown shallow fissures, scurfy, soon flaking or scaly, the mature bark 1.5-2 cm. thick, rather light gray with a reddish tinge from the fissures, scaly, the scales commonly 5-10 cm. long, 2-5 cm. wide, concave, rough, brown beneath, the basal bark on old trees frequently fissured, forming small oblong plates; crown oblong, acute and conical above, obtuse in old trees; foliage dark, bluish-green, often glaucous, some individuals even suggesting P. pungens; needles spreading in all directions, averaging 2 cm. in length, curved inwards, rhomboidal in cross-section, with an oil-tube along each side, persistent 5-6 years, stomata evident on all four surfaces, apex acute and mucronate, the base slender, articulate, the persistent stubs .8-.9 mm. long, spreading, expanded at the apex; staminate cones 1.5 cm. long, 8 mm. wide, anthers 2.5 mm. long, the tip rounded, erose-denticulate; ovulate cones borne near the apex of the tree on dwarf lateral and apical branchlets from second year wood, 3-6 cm. long, 1.5-2 cm. wide, before opening, narrowed at both ends, green or purplish, scales oval-rhomboid or obovate-rhomboid, 12-15 mm. long, rounded to truncate at the apex, finely eroded, even notched, faintly striate, 2.5-3 cm. wide, oblong after opening; seeds 2.5 mm. long, the wing rose tinted, oval, 4-6 mm. long. Seedling 1-2 cm. tall, cotyledons 3-4, 3-angled, sometimes persistent the second year, scarcely 1 cm. long, less than 1 mm. wide, very acute but hardly mucronate, first leaves 6-8 mm. long, slender, acute and tipped with a hyaline mucro curving upwards at the end, 3-angled, light green, margin minutely and sparingly serrulate, the serrations glandular tipped, jointed .5 mm. above the base, decurrent below the joint, the primary stems white.

a

a

4. Pseudotsuga Carr. Douglas Fir.

Trees with needle-like leaves, alternate and spiral, spreading in all directions, soft, flattened, slightly decurrent below the joint, persistent for several years, leaving a slight appressed, stubby base when shed. Monoecious, the staminate cones axillary, sessile, cylindrical, each stamen with a short reflexed appendage at the tip; ovulate cones terminal or subterminal, solitary, formed of a spiral series of fertile sporophylls (scales), each bearing 2 ovules on the upper surface, each subtended by a conspicuous 3-toothed bract; fruit a more or less woody pendent cone, maturing the first year, ~~and~~ deciduous or persistent the following year, the scales thin; seeds winged. Cotyledons several.

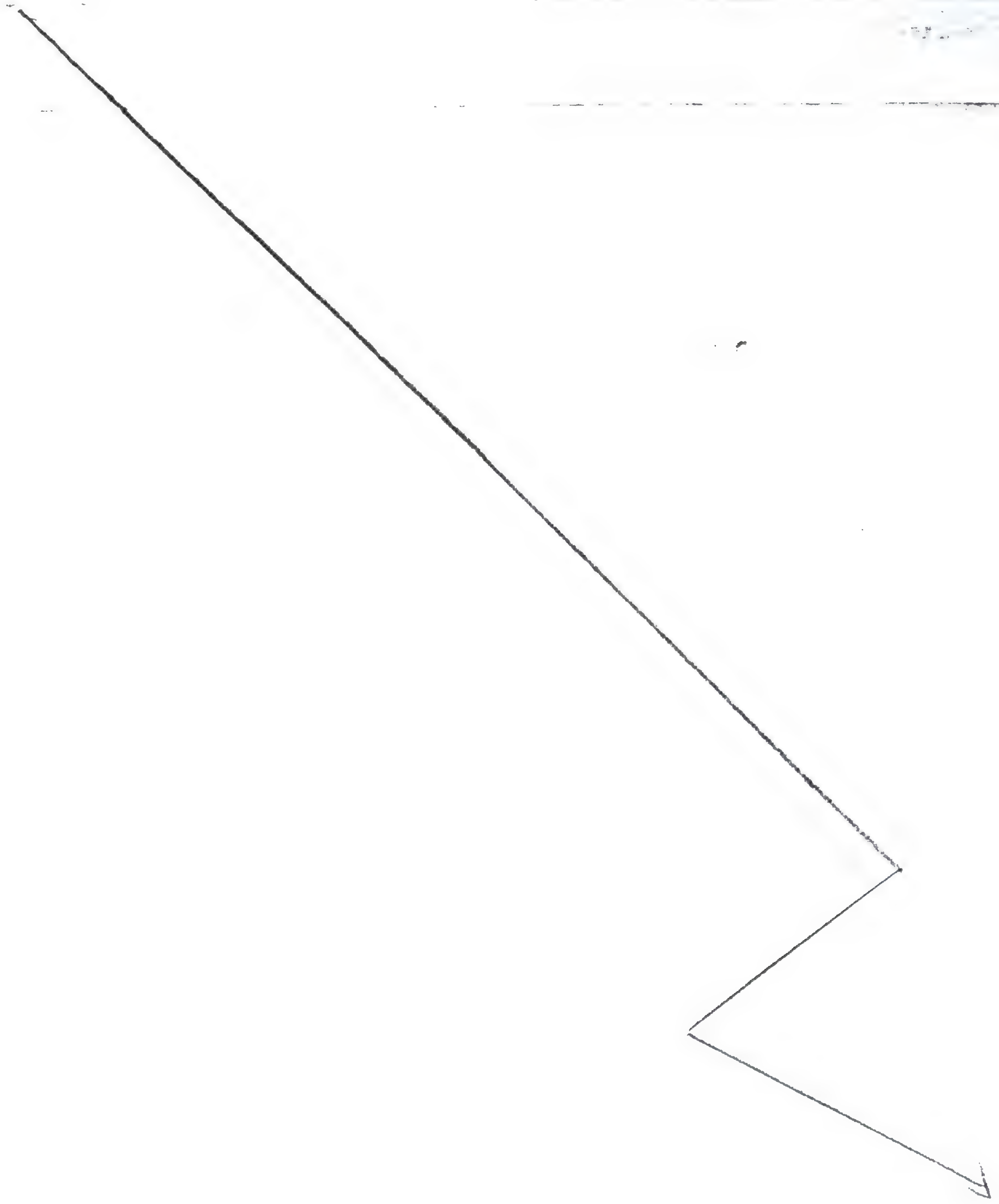
entire, the 3-toothed bract conspicuously extended beyond the scale

1. Pseudotsuga taxifolia (Lamb.) Britton. [redacted] → A forest tree 30-40 m. tall, the trunk tapering, the base gradually expanded, [redacted] → the deeply furrowed and thick gray bark, the furrows being yellowish within; D.B.H. as much as 1.-1.5 m. Branches more or less horizontal, the lower tending to droop, the upper ascending, the branchlets slender and gracefully pendulous, giving the rather broad crown a characteristic graceful aspect, olivaceous or light brown, shining, puberulent, roughened by the leaf-bases; young bark light gray, very dull, early becoming longitudinally fissured, the fissures forming an irregular network, distinctly yellowish at the bottom, outer bark separating readily, leaving a pock-marked inner bark, mature bark 2-3 cm. thick, rather corky, the basal portions several times thicker, dark gray but soft in shade, yellowish when cut, irregularly and deeply furrowed, the furrows traceable often for several feet, yellowish at the bottom, the ridges irregular in size and very rough and uneven on the surface and edges; crown of younger trees or isolated trees at high elevations broadly pyramidal, the apex rather acute, that of older trees and forest grown trees rounded or obtuse; foliage rather yellowish-green en masse, but dark; needles 2-3 cm. long, soft, acute and tipped with a hyaline mucro, or blunt, variable on the same tree, flat, the margins rounded, the midvein impressed, the stomata more or less evident beneath, each margin with two minute resin ducts, narrowed abruptly at the base with a twist and jointed, but slightly decurrent below the joint. Staminate cones yellow, 8-12 mm. long, cylindrical, the stamen subulate-triangular at the apex; ovulate cones borne mostly in the upper half of the crown on short dwarf lateral branchlets from second year wood, mature cones 4-6 cm. long, green and purplish, scales orbicular, minutely eroded, about 1.5 cm., long, the bract somewhat larger, oblong, notched at the tip, the notch provided with a very sharp mucro 5-7 mm. long; seeds 3 mm. long, wings oval, 8-9 mm. long. Seedling 3-4 cm. tall, dark green, cotyledons 7-8, persistent to second year, 1.5-2 cm. long, 1.5 mm. wide, flat, rather glossy, acute but not mucronate, stomata hardly visible, midvein visible but not prominent; branchlets minutely puberulent; first leaves 1-1.5 cm. long, acute and tipped with a hyaline mucro. (P. mucronata (Raf.) Sudw.).

tr.

Ranges from 2500 feet to 6000 feet in favorable places, occupying drier slopes especially with southern exposure. Below 3000 ft. merges with Pinus ponderosa. At higher elevations is most commonly associated with Larix occidentalis or Abies grandis. Is frequently found on rocky exposed slopes from 3000-5000 ft., forming nearly pure stands. Is apparently the climax tree of a transitional belt between the white pine type and the

yellow pine type persisting as such in the drier situations at all elevations up to 6000 feet.



5. Abies (Tourn.) Hill. Fir.

Trees with needle-like foliage, alternate and spiral, curling upwards or appearing as in flat sprays due to a twist near the base, soft, blunt, flattened, not decurrent, persistent for several years, leaving a circular flat scar on the branch when shed. The staminate and ovulate cones axillary, borne on the same tree, the former on the lower sides of the branches, anther sacs 2; the latter formed of a spiral series of fertile sporophylls (scales) each bearing two ovules on the upper surface, each subtended by an inconspicuous bract; fruit a more or less woody cone, erect, maturing the first year, the scales thin, falling from the persistent axis when the seeds are shed; seeds winged; cotyledons several.

~~Key to the Species~~

Lowermost branches bearing needles apparently in 2-ranked sprays; oil-ducts minute, at the edge of the leaf; upper surface of leaf dark green and glossy, without stomata; cones green ..... 2. A. grandis

All needles curved upwards, none appearing two ranked; oil ducts visible to the naked eye, midway between midvein and margin; upper surface usually bearing stomata; cones purplish black ..... 1. A. lasiocarpa

1. A. lasiocarpa (Hook) Nutt. Alpine Fir. A striking and beautiful tree of higher elevations characterized in our region by the very narrow, spire-like crown and dark foliage; commonly 20-25 m. tall, rarely as much as 35 m., with D.B.H. of 30-45 cm. Branches spreading, soon curved on the lower parts, strongly so in old trees, branchlets curving, smoke-colored with a yellowish tinge from the leaf scars, pubescent; young bark ashy gray, mottled with lighter splashes due to crustose lichens, smooth, the lenticels prominent, transverse, 1-2 cm. long, scurfy, resin pockets conspicuous, mature bark scarcely 1 cm. thick, fissured only at the base of the tree, the furrows narrow, irregular; crown persistent to the base, narrowly conical, very acute, dark green, the interior dark, due to hanging Alectoria which gives the foliage a very dark color at a distance; needles dense, curving upwards, never in 2-ranked sprays, 2-2.5 cm. long, 1.5 mm. wide, persistent 7-8 years or more, glossy, the stomata usually evident on both surfaces, especially so beneath, the vein impressed, elevated beneath, the margins concave, oil ducts visible to the naked eye, midway between the margin and midvein, apex blunt, sometimes notched, the needles of the uppermost branches very acute and subspinose, rigid, the base narrowed, twisted, then somewhat expanded at the joint, the scar margin not elevated. Staminate cones 15-20 mm. long, the anthers 20-30, deep bluish-purple, raised on a short stalk; ovulate cones borne at the very apex of the tree, clustered, dull purplish-black, cylindrical, 5-8 cm. long, 2-2.5 cm. wide, rounded at the base, blunt at the apex but scarcely truncate or concave, the scales broadly cuneate, 14-15 mm. wide, rounded-truncate, the exposed surface velvety pubescent, bract 5-6 mm. long, oval, hardly retuse, the mucro 2.5-3 mm. long, the margin finely but irregularly toothed; seed 4-4.5 mm. long, the wing oval-cuneate, 1 cm. long, 7-8 mm. wide, crinkly.. ~~(A. subalpina Engelm.)~~

Abundant on moist subalpine slopes especially of northerly exposure and forming here the climax, associated with Picea Engelmannii throughout our range and, above 6000 ft., chiefly with Pinus albicaulis or Tsuga Mertensiana. Descends as low as 2500 ft., together with Picea Engelmannii along the margins of meadows and cool stream bottoms.

2. A. grandis (Dougl.) Lindl. → White Fir. → A stately forest tree in height from 30-50 m., [redacted] glossy dark green leaves arranged in two ranked, flat sprays and the slender straight trunk; D.B.H. 1-1.5 m. Branches more or less horizontal, spreading, the branchlets spreading, light brown or olivaceous, somewhat lustrous, puberulent, smooth; young bark smooth, gray with an olivaceous or sometimes reddish tinge marked by numerous transverse lenticels 1-3 mm. wide which become ashy, resin pockets frequent, remaining unfissured until 45-50 cm. or more in diameter, the fissures then uneven, longitudinal, traceable for several feet, the mature bark 2-2.5 cm. thick, eventually broken into small, dark ashy gray, flat plates, 2.5-4 cm. wide, 40-50 cm. long or more; crown conical, acute except in old trees, rather open, pruned to 25-30 mm. in close stands; leaves persisting 7-8 years, dark green and glossy, glaucous beneath, spirally arranged but those of the lowermost branches appearing in two-ranked sprays by a twist near the base, those above curving upwards, flat, 1.3 cm. long, about 2.5 mm. wide, rounded at the tip and usually but not always notched, oil ducts 2, minute, near the edge of the leaf, vein rather prominently impressed on the upper surface, elevated beneath, the margins concave, stomata white in 6-8 rows on either side, the base narrowed then somewhat expanded at the articulation, leaving a circular lightly elevated scar. Staminate cones, 15-18 mm. long, the stamens numerous, smaller than those of A. lasiocarpa, yellow, raised on a short stalk subequal to the scales in length. Ovulate cones borne in the very apex of the tree, clustered, yellowish green, 6-7 cm. x 2.8-3.2 cm., cylindrical, rounded at the base, the apex flattened and lightly concave, scales broadly cuneate, 2.5-3 cm. wide, rounded truncate at the apex, the exposed surface velvety pubescent, bract 5 mm. long, retuse, the notch with a short mucro, the margin erose-serrulate; seed 7-9 mm. long, the wing cuneate, glossy, 12-14 mm. x 16-18 mm. long. Seedling 3-4 cm. tall, cotyledons 6-7, persistent the second year, dark green, glossy, about 2 cm. long, 1.4-2 mm. wide, flat, narrowed at the apex but blunt, midvein prominent, stomata on the lower surface only; first leaves 1-1.5 cm. long, flat, glossy, usually narrowed below the middle, blunt but usually lightly notched; first branch at about 4-5 years; buds resinous.

A common associate of Pinus monticola and Pseudotsuga taxifolia, reaching its greatest development in our region below 4500 ft., expecially on flats, forming stands with either white pine or Douglas fir or both. Seldom found above 5500 feet, but may occur at 6000 ft. or more, associated with Abies lasiocarpa, Picea Engelmannii and Pinus albicaulis.

6. Tsuga Carr. Hemlock.

Trees with needle-like foliage, alternate and spiral, spreading in all directions or appearing somewhat 2-ranked, rather soft, blunt, flattened or somewhat 3-angled, decurrent and jointed at the base, persistent for several years, leaving a short, appressed, stubby base beneath the joint when shed. The staminate cones axillary on second year wood, globose, the 2-chambered anthers globose; ovulate cones borne on the same plant, solitary, terminal, formed of a spiral series of fertile sporophylls (ie. scales) each bearing two ovules on the upper surface, each subtended by an inconspicuous bract; fruit a more or less woody pendent cone, maturing the first year and deciduous or persistent the following year, the scales thin; seeds winged. Cotyledons 3-6, flat.

~~Key to the Species~~

4 { Needles flattened, triangular in cross-section, plump, the stomata prominent on both surfaces, cones 5-6 cm. long. ..... 2. T. Mertensiana

4 { Needles flat, the upper surface green, the stomata prominent only beneath; cones 2.5-3 cm. long. ..... 1. T. heterophylla

1. T. heterophylla (Raf.) Sargt. Coast Hemlock. ——→ A massive forest tree commonly 50 m. tall, characterized by the feathery foliage and drooping branchlets. Trunk of mature trees with slight taper, but tapering rapidly in the upper parts; D.B.H. commonly 1-2 m. or more in old trees. Branchlets straw-colored or tan, woolly, gray the second year, roughened by the persistent leaf-bases and rather scurfy; young bark dark gray with but a slight lustre, marked by transverse lenticels, breaking into irregular flakes which on falling away leave a reddish-tinged scar; mature bark gray with a reddish cast, 3-4 cm. thick, cerise when cut, longitudinally furrowed, the ridges flat, forming fairly regular plates, 2-3 cm. x 15-40 cm., the fissures forming a net work. Crown conical, acute when young, rather obtuse in old trees, the leader drooping. Branches spreading in young trees, drooping perceptibly in older trees, pruned to a height of 18-20 m. in the maturing forest. Foliage yellowish green en masse, needles deciduous in 3d-5th year, very irregular in length, flat and thin, 5-20 mm. long, averaging about 12-15 mm., [redacted] in rather flattened sprays, oblong, blunt, narrowed abruptly at the base to a petiole 1 mm. long or less, with a pronounced twist, margin sparingly and minutely toothed, the midvein impressed above, prominent beneath, with 5-6 rows of white stomata on either side, the lower surface hence glaucous, the leaf-base decurrent about 1 mm., the apex scarcely free, however. Staminate cones 3-4 mm. in diam[redacted], globose, paired, dehiscent by a valve from the base, the stalk about .5 mm. long; ovulate cones borne mostly in the upper half of the crown, terminal, 25-30 mm. long, narrowly elliptical before opening, green, the scale margins often reddish, becoming ovate to subglobose after opening, tan or clay-colored, opening in September, deciduous the same year or sometimes persisting; scales obovate, 10-12 mm. long, puberulent; seeds 3 mm. long, wing 3-3.5 mm. x 9-10 mm. Seedling 1-2 cm. tall, dark green, cotyledons 3-4, 6-7 mm. long, 1 mm. wide, narrowed at the apex but rather blunt, first leaves alternate, but apparently whorled, apex blunt, margins minutely serrulate, the

teeth glandular-tipped, bases swollen, articulate and decurrent, stem puberulent, branching the fourth or fifth year.

Abundant below 5000 ft., especially north of the Coeur d'Alene River, scant in the St. Joe and Clearwater forests. Associated especially with Thuja plicata and in the northern part of the range persisting in the climax type as a codominant by reason of its great shade tolerance.

2. T. Mertensiana (Bong.) Sargt. Mountain Hemlock. ——→ A handsome subalpine tree of usually small dimensions, rarely over 15 m. tall in our region, with D.B.H. of 25-50 cm., infrequently as much as 25 m. tall, with D.B.H. of 120 cm., in which case it tapers rapidly; branchlets woolly, soon checking longitudinally, becoming light gray and scurfy; young bark scaly, the scales curling somewhat, mature bark 3-4 cm. thick, dark reddish brown, deeply and rather narrowly furrowed, the furrows forming a net work, reddish within, the ridges narrow; crown narrowly conical, dense, acute, the leader pendulous, the branches slender and drooping, commonly extending to the base in open stands; foliage bluish green, rather dark, but the new foliage glaucous, needles deciduous in third to fifth year, spreading on all sides of the branch, 15-20 mm. long, rounded at the apex, narrowed at the base, triangular in cross-section and appearing plump and not flat, stomata prominent in several rows on both surfaces, leaving a short leaf base after abscission; staminate cones 5-6 mm. long, the purplish anthers raised on a stalk, ovulate cones borne mostly in the upper third of the crown, usually purple in flower, narrowly elliptical before opening, acute, elliptical-oblong when open, 5-6 cm. long, 2.5-3 cm. broad, green to purplish black, pendulous, falling during the winter, scales cuneate, rounded-truncate at the apex, 1 cm. long, seed 2-5 mm. long, the wing oval, twice as long. Seedlings 3-5 cm. tall, their hypocotyls red; cotyledons 3-6, commonly 4, ridged along the middle on the upper surface and bearing longitudinal rows of minute white dots, 1.5-2.5 cm. long, 1.5-2 mm. wide, blunt, entire, green on the lower surface; first leaves 8-10 mm. long, white-dotted on the lower surface.

Commonly along ridges and high slopes above 5500 feet, associated with Pinus albicaulis and Abies lasiocarpa but occasionally descending as low as 4500 feet mingling with Tsuga heterophylla and Pinus monticola. Not seen in the Priest River drainage. Abundant in the eastern portions of the St. Joe and Clearwater forests.

Cupressaceae. Cypress Family.

Evergreen trees or shrubs with small scale-like leaves (in Juniperus communis needle-like) appressed closely to and covering the branchlets or spreading, arranged in whorls of 3 or opposite. Staminate and ovulate cones borne on the same or different plants, both terminal, the former small of few to several cone-scales bearing 2-several anther sacs, the ovulate cones subglobose or elliptical, of 2-4 pairs of thin woody and discrete or fleshy and coalescent cone-scales; ovules maturing to form a winged seed or berry-like aromatic fruit enclosing 1-3 wingless seeds. Cotyledons 2 or several.

0 Branchlets in flat sprays, bright green, the leaves 2-5 mm. long, arranged in alternate pairs, each pair laterally flattened; cone woody; bark fibrous, cinnamon brown weathering to gray 4 — 1. Thuja

0 Branchlets like fishing cord, dull green, the leaves 1-2 mm. long, arranged in alternate pairs but not flattened or in whorls of 3; cone fleshy, berry-like; bark scaly, purplish gray 4 — 2. Juniperus

1. Thuja L. Arbor-Vitae.

Trees with scale-like overlapping leaves in opposite pairs, the branchlets flattened and spraylike, arranged in one plane. Staminate and ovulate cones borne on the same tree, terminal and solitary, the former formed of several peltate sporophylls (scales) each bearing 2-4 globose anthers, the latter formed of 4 alternately arranged pairs of fertile sporophylls (scales) each bearing ovules on the upper surface; fruit a more or less woody cone, the short branchlet on which it is borne being recurved and the cone erect, maturing the same season, the scales thin; seeds winged. Cotyledons 2, the primary leaves needle-like, in whorls.

1. T. plicata Donn. Western Red Cedar. → A striking and massive tree as much as 60 m. tall, characterized by the conical trunk which decreases rapidly in diameter, the heavily buttressed and fluted base, which wea dull and the thin cinnamon-colored bark, D.B.H. commonly 1 to 2 m. or as much as 4 m. in old trees. Branchlets light brown, becoming gray after needles are shed, the young bark light gray, tinged with red, silky-shining, appearing as though very tightly drawn, soon broken into grayish shreds, the interstices cinnamon, the shreds becoming thicker and thicker, seeming in mature bark to be laced loosely back and forth in several strata. Crown conical and acute in young trees, more blunt, even rounded in old trees, the leader drooping. Branches slender, curving upwards in youth, soon drooping, pruned to a height of 18-20 m. in the maturing forest. Foliage yellowish-green en masse, leaves 2-3 mm. long, disposed in flat sprays, closely pressed to the branchlet in alternate pairs, overlapping, broadly ovate, acuminate, tipped with a short mucro, those of the upper surface of the spray glossy, those beneath glaucous, the branchlets flattened dorsiventrally, the lateral pairs of leaves thus being folded, giving a braided appearance to the spray, each with an obscure glandular depression in the middle which is translucent in young growth, those on the main branchlets persistent for several years, increasing in size to 5-6 mm., those on the lateral branchlets shed with the branchlet in the second or third year. Staminate cones minute, borne on the tips of branchlets, glaucous; ovulate cones borne mostly in the upper half of the crown, at the apices of short lateral branchlets, recurved and erect, maturing in late August or early September, rarely in July, 10-12 mm. long, green, becoming brown, smooth, elliptical in outline before opening, scales commonly 4 pairs, obovate, each tipped with a triangular mucro, each bearing two seeds; seeds 4 mm. long, somewhat less than 1 mm. wide, the wings oblong, 5 mm. long, 1 mm. wide. Seedlings 1-2 cm. tall, light green, cotyledons 2, 5-7 mm. long, flat, rounded at the apex, narrowed below the middle, first leaves in whorls of 3-4, 4-5 mm. long, flat, acute with a hyaline mucro, soon reflexed, decurrent, the spraylike branchlets appearing during the first year. (T. gigantea Nuttall).

Abundant below 5000 feet especially on gentle northerly slopes or flats, reaching its greatest development in broad alluvial stream bottoms where it frequently forms small groves of individuals with D.B.H. 2 m. or more, in pure stand or associated with Tsuga heterophylla. A common associate of white pine and the climax tree of the white pine type.

2. Juniperus L. Juniper.

Trees or shrubs, with needle-like or scale-like leaves; in our species if needle-like, in whorls of three curving toward the apex, if scale-like, in opposite pairs, closely pressed to the branchlet, the branchlets appearing like fishing cord, the staminate and ovulate cones borne on separate plants, stamens bearing several anther sacs, the ovulate cones subglobose, formed of 2-3 series of fleshy, more or less coalescent sporophylls which at maturity form a berry-like, aromatic fruit maturing the second season, enclosing 1-3 bony seeds. Cotyledons several.

[redacted]

tr. Needles about 1 cm. long, sharp, in whorls of three — 2. J. communis

Needles about 1 mm. long, opposite, the branchlets cordlike — 1. J. scopulorum.

Rocky Mountain

1. J. scopulorum Sargt. [redacted] Juniper. ——→ A small tree with ovate dense crown, subacute at the apex, bluish green and glaucous, rarely more than 4-5 m. tall in our region; bark very scaly, falling away, ashy with a reddish or lavender tinge; branches curving upwards, rarely if ever drooping in our region, branchlets gray, smooth, soon scaly, brown in the second year, covered with the persistent leaves, new growth green, columnar, 1 mm. or less in diameter; needles 1-1.3 mm. long, ovate-subulate, acute, in opposite pairs, overlapping, decurrent, closely pressed to the branchlet, glaucous toward the base, the gland oval, obscure, hardly depressed, without resin, seated above the angle formed by the next lower pair of leaves; staminate cones yellow, 3-4 mm. long, borne on the tips of the branchlets, berries born throughout on short lateral branches, ovoid, 5-6 mm. long, very glaucous, bluish at maturity, maturing the second year; seeds commonly 2-3.5 mm. long, with three more or less distinct longitudinal ridges on the back.

A rare tree with us, seen only in the Priest Lake region, on the rocky ledges of Upper Priest Lake and in rock crevices of cliffs on Lion's Head, 5000 feet or more.

J. depressa Pursh.

2. J. communis (L.) var. ~~sibirica (Burgsd.) Rydb.~~ Dwarf Juniper. → A low shrub rarely more than 1 m. tall in our region, at lower elevations (as in the Kootenai Valley) with branches ascending, more or less straight, at higher elevations sprawling over rocks, even pendent; bark ashy, scaling, branchlets light brown, scaling very quickly; leaves persistent for several years, in whorls of three, averaging about 10 mm. long, rigid, curving upwards, acuminate to a spinose tip, the upper surface white, channeled, the lower surface glossy, keeled, the decurrent portion bearing a conspicuous oil bearing tubercle, decurrent at the base; berries axillary, subglobose, 6-9 mm. in diameter, mature the second summer, green, then bluish-black with a bloom, commonly with 2-3 seeds, staminate cones numerous, axillary, 2.5 mm. long, the anther sacs 4-6, the free tip of the scale triangular-ovate, acute, 1 mm. long. ~~(J. communis var. depressa Pursh.)~~

Infrequent in elevations as low as 2000 ft., then occurring in dry gravelly spots, frequent at subalpine elevations sprawling over and pendent from rock ledges, where it frequently forms ground cover of some importance in soil formation.

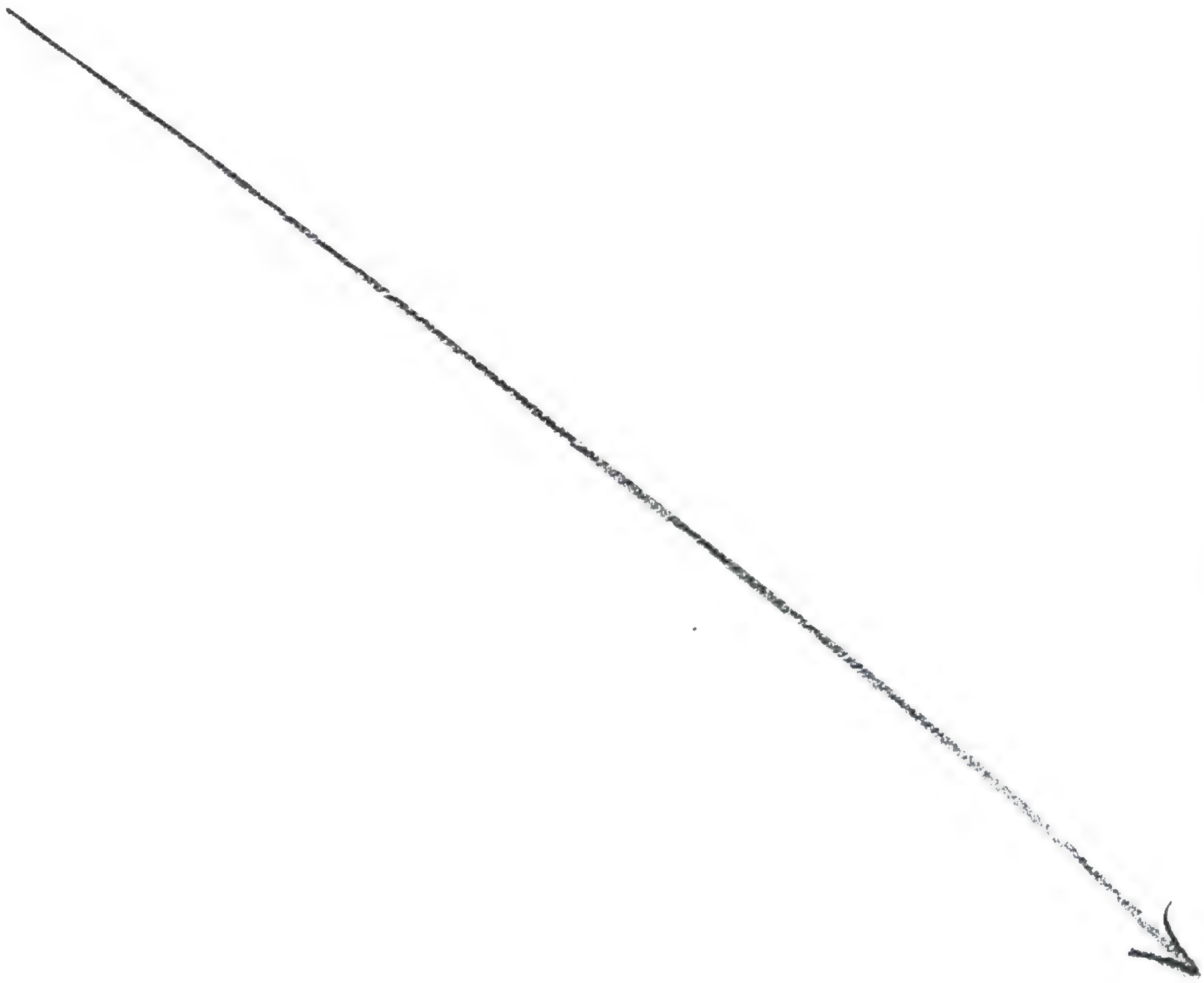
2. Angiospermae. Flowering Plants.

Trees, shrubs or herbs in which the ovules (or the mature seeds) are surrounded by an ovary wall which with occasional accessory parts becomes the fruit. Plants with true flowers which typically bear a more or less conspicuous floral envelope. Cotyledons either one or two.

I. Dicotyledones. Dicotyledons.

Plants herbaceous, shrubby or of tree habit in our region. Leaves with net venation for the most part. Vascular bundles regularly distributed in more or less concentric cylinders of continuous or discontinuous bundles with a central pith. Flower parts mostly in 5's or 4's, rarely in 3's. 2's or

The embryo with two cotyledons.



Ranunculaceae. Buttercup Family.

Herbs with alternate and basal leaves (opposite in Clematis, a vine with). Flowers various, perfect, commonly in racemes or panicles, less often solitary or axillary. Sepals 5, commonly petal-like, distinct. Petals 4 or 5 to several, or wanting. Stamens, numerous, indefinite. Pistils several or numerous, more or less indefinite, superior, 1-chambered. Fruit a cluster of follicles or achenes, rarely a berry.

0 Submerged aquatics — 1. Ranunculus

0 Terrestrial plants

2 Leaves opposite; flowers and fruits showy; achenes 6 with plumose tails — 2. Clematis

2 Leaves in a whorl of three subtending the usually solitary flower, basal leaves present or none; 6 achenes pubescent or with a plumose tail — 3. Anemone

2 Leaves alternate or basal, none whorled

4 Fruit a berry; flowers small and white in a 8 terminal spicate raceme; pistil 1 — 4. Actaea

4 Fruit a cluster of follicles (with several seeds) or achenes (with 1 seed); flowers 8 (except Aquilegia) blue or white; pistils several

6 Fruit a cluster of follicles; ovaries 4-8

8 Perianth regular, neither spurred nor hooded; 12 leaves basal or two on the stem

10 Leaves all basal

12 Flowers (and fruit clusters) 3, in 16 an umbel — 5. Coptis

12 Flowers (and fruit clusters) . . . 16 solitary — 6. Caltha

10 Stem leaves 2; flower solitary — 7. Trollius

8 Perianth either hooded or spurred, showy; 12 leaves basal and cauline, the cauline usually more than two, or if two, all trifoliolate

10 Petals 5, each one prolonged below 14 into a conspicuous spur; flowers yellow or red — 8. Aquilegia

10 Petals 2 or 4, inconspicuous; sepals 4 5, showy, one either spurred or forming a hood; flowers blue

12 Upper sepal prolonged into a 16 downward spur; petals 4, in two pairs — 9. Delphinium

12 Upper sepal strongly hooded; petals
16 2, inside the hood — 10. Aconitum

6 Fruit a cluster of achenes; ovaries numerous
8 Leaves triternately compound, the numerous
12 leaflets subequal, glabrous; petals none, the flowers numerous, small, dioecious — 11. Thalictrum

8 Leaves simple or once ternate
10 Flowers yellow, perfect and regular — 1. Ranunculus

10 Flowers white; petals wanting; sepals
14 caducous; the stamens conspicuous — 12. Trautvetteria

1. Ranunculus L. Buttercup.

Annual or perennial herbs, aquatic or of moist places. Leaves basal and alternate, some rarely opposite, petioles sheathing at the base, blades commonly ternately divided or lobed, the segments filiform in floating aquatic species. Flowers solitary or in terminal cymes, yellow (or white), Sepals usually 5, deciduous or persistent, recurving. Petals 5-16 (in some species 2-3) provided with a small nectariferous pit near the base, this naked or covered with a scale. Stamens numerous. Pistils numerous. Fruit a globose or cylindrical cluster of turgid or compressed achenes, which are tipped by the permanent characteristic styles.

0 Plants submerged in water, the leaves dissected into
4 filiform segments or with a few floating leaves

2 Segments of submerged leaves hairlike, not
6 { flattened; flowers white; achenes transversely
wrinkled, not margined — 1. R. ~~aquatilis~~ trichophyllus

2 Segments of submerged leaves flattened, or if growing
6 { in mud, the leaves 3-lobed to the base, the lobes again lobed or toothed above the middle; flowers bright yellow; achenes not wrinkled but with a calloused margin — 2. R. delphinifolius

0 Plants terrestrial, leaves of one kind only, but variable
4 in shape

2 Plants stoloniferous, rooting at the nodes, creeping
6 over muddy places

4 Leaves entire or crenately toothed, not lobed

6 Leaves cordate at the base; achenes in a
9 cylindrical cluster — 3. R. cymbalaria

6 Leaves narrowed at the base; achenes in a
9 globose cluster — 4. R. reptans

4 Leaves palmately 3-5-lobed, the lobes again
8 toothed — 5. R. limosus

2 Plants not stoloniferous, erect

4 All leaves simple, crenate or entire, neither
8 lobed nor divided

Plants 30-40 cm. tall, stiffish, with 2-3
pairs of opposite leaves in the ~~in-~~
florescence — 6. R. alismaefolius

6 Plants 10-30 cm. tall; not stiffish; leaves opposite
10 or alternate

8 Plants 10-30 cm. tall with a single pair of
12 opposite leaves subtending the inflorescence

10 Basal leaves varying from elliptical to spatulate
14 or rotund, not cordate at the base — 7. R. alismifolius

10 Basal leaves ovate, cordate at the base — 8. R. Populago

8 Plants 10-20 cm. tall, the few stem leaves alternate,
12 none in opposite pairs — 9. R. glaberrimus

4 Stem leaves, at least, either deeply lobed or
8 divided or all leaves compound; basal leaves
entire in one species

6 Glabrous herbs 10-30 cm. tall; flowers 1-3

8 Basal leaves entire or nearly so, those
2 of the stem sometimes entire, sometimes 3-lobed or toothed; styles less than 1 mm. long — 9. R. glaberrimus

8 Basal leaves usually 3-parted, sometimes
12 3-lobed, less often merely crenate; styles 1-2 mm. long — 10. R. Eschscholtzii

6 More or less hispid herbs 30-60 cm. tall or
10 more; basal leaves mostly 3-5-foliolate; flowers numerous or at least several

3 Beak of ovaries and achenes less than
12 1 mm. long; cluster of achenes cylindrical or oval

Achenes 2 mm. broad, flattened, the
clusters 10-12 mm. long — 11. R. pennsylvanicus

Achenes 1 mm. broad, turgid, not
14 flattened, the clusters 7-8 mm. long — 12. R. sceleratus

Beak of ovaries and achenes 1-2 mm.
2 long; cluster of achenes globose

Petals 2-3 mm. long; beak of achenes
clearly hooked — 13. R. ~~Bongardi~~ Douglasii

Petals 4-5 mm. or 10-12 mm. long;
beak of achenes straight

2.	Petals 4-5 mm. long, achenes not margined with a narrow wing	14. R. Macounii
2.	Petals 10-12 mm. long, achenes narrowly margined	15. R. maximus

1. R. trichophyllus Chaix. White Water Crowfoot. A slender submerged and floating aquatic; stems commonly 1 m. long; leaves submerged, alternate, on sheathing petioles .5-1.5 cm. long, the blades 1-2 cm. long, ternately dissected into slender, hair-like divisions, sometimes with a few floating leaves 1-1.5 cm. broad, reniform in outline, palmately 3-lobed, the lobes again shallowly 3-toothed, appressed-pubescent; flowers floating, solitary, opposite the upper leaves; sepals ovate, obtuse, 1.5-2.5 mm. long; petals 5-6 mm. long, narrowly obovate, whitish, the nectar pit minute, not covered with a scale; receptacle more or less hairy; achenes 12-14, forming a globose cluster 5-6 mm. in diameter, transversely rugose, plump, frequently hispidulous, without a callous margin, the walls thin.

Frequent in shallow pools of slow moving streams or lake margins or ponds, 2500-5000 feet or more. R. aquatilis L., the European reciprocal species, has been found but once, in Mass. (Rhod. 38: 30). Benson (Am. Jour. Bot. 35: 176) recognises this plant as R. aquatilis, however.

2. R. delphinifolius Torrey. Yellow Water Crowfoot. A slender submerged aquatic, rooting in the mud of shallow pools becoming terrestrial upon their drying out, then creeping over mud; stems fistulous, of various lengths, commonly 1 m. or more long; leaves of two kinds, those appearing early in the year submerged in water, 2.5-3 cm. broad, ternately dissected into narrow lobes, not, however, filiform, but flat and acute, the lower portion of the cuneate principal lobes 1-2 mm. wide, petioles 1-4 cm. long, sheathing at the base, these leaves withering as the pool dries out, new leaves appearing on short stolons from their axils, 1-2 cm. broad, reniform, ternately 3-lobed nearly to the base, the lobes cuneate, again lobed and toothed above the middle, glabrous or sparingly villous on the lower surface, the petioles 1.5-2 cm. long, villous; flowers 2-4 in a terminal cyme, peduncles stout and fistulous, 2-3 cm. long or more; sepals 5 mm. long; petals bright yellow, rotund-obovate, the gland seated within a margined pit, 6-9 mm. long, achenes forming a subglobose head 8 mm. long, 6 mm. wide, the achenes 2 mm. in diameter, numerous, flattened, nearly smooth, with a conspicuous corky margin .5 mm. broad, the persistent style 1 mm. long.

Occasional in muddy lagoons or shallow ponds or swamps; R. Purshii which might be sought here may be distinguished by the achenes without corky callous margins. Though known from eastern Wash., it is not known to occur in our region.

3. R. cymbalaria Pursh. var. saximontanus Fern. Low herb 5-15 cm. tall; glabrous throughout or sparingly hirsute, spreading by slender stolons; leaves basal, the blades 1.5-3 cm. long, ovate to rotund-reniform, very obtuse, cordate at the base, crenately-toothed, the teeth toward the apex larger, petioles 3-6 cm. long; flowers yellow, 1-5 on scapes little exceeding the leaves; sepals ovate, 3-4 mm. long; petals subequal, oblong-lanceolate, narrowed at the base and bearing a nectariferous pit; achenes about 1 mm. long, crowded into a cylindrical cluster 1 cm. long or less, striate, flattened, [illegible] style [illegible].

[illegible], [illegible] t., [illegible]; Bonaparte [illegible], Christ 770.

4. R. reptans var. ovalis (Bigel.) T. & G. Stems 10-30 cm. long, filiform, ascending from a small tuft of basal leaves, decumbent and commonly rooting at the nodes; basal leaves elliptical-lanceolate to oblong-oblanceolate, acute, entire, the blades 2-3 cm. long, narrowed to a petiole 1-2 cm. long, glabrate or appressed-pubescent, especially beneath, the cauline leaves alternate, commonly bearing a pair of leaves in the axils; flowers solitary, pedicels about 1 cm. long; sepals yellow, membranous, ovate, deciduous; petals 4-4.5 mm. long, obovate, narrowed at the very base to a short claw, bright yellow, the gland a small pit near the base of the blade, sometimes covered with a hemispherical scale; achenes 1.3 mm. long, turgid but somewhat compressed, few in a small globose cluster 3-4 mm. wide. (R. r. var. strigulosus Freyn).

Frequent in muddy and swampy places throughout our region, especially where the mud is newly formed, sometimes forming dense matted colonies several yards in diameter.

5. R. limosus Nutt. Low herbs creeping over muddy ground, the stems prostrate or ascending at the tips 10-25 cm. long, mostly hirsute, or some nearly glabrous; leaves kidney-shaped, 1-2.5 cm. broad, palmately 5-lobed, the middle lobe being largest and most deeply cut, the sinuses varying in depth, the lobes again 3-5-toothed or incised, the teeth rounded and blunt, both surfaces softly hirsute, the petioles 1-4 cm. long, the stipules ovate, membranous, 2-3 mm. broad; flowers few, erect, on pedicels 1-3 cm. long; petals orbicular, 4.5-5 mm. in diameter, the gland narrowly margined; achenes in a subglobose cluster about 6 mm. in diameter, smooth and glabrous, the body scarcely 2 mm. long, flattened, the style .5-.8 mm. long, recurving at the tip.

Conners Ferry, Kling.

R. hebecarpus Hook. & Arn. Delicate annuals with filiform roots; stems hairy; basal leaves cordate-reniform, 6-15 mm. long, 12-22 mm. wide, triternate, the ultimate lobes acute; petals few or 0, 1 mm. long; achenes round-ovate, densely papillate-setose, the beak stout, 6 mm. long, hooked. — Shady situations, barely entering our region, in Latah Co. (Juliaetta, fide Benson), its northernmost station.

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6. R. alismaefolius Geyer. Roots fascicled, rather fleshy; plants glabrous throughout, 10-40 cm. tall, the stems stiffish; basal leaves variable, on petioles 10-20 cm. long, the blades 5-10 cm. long, lanceolate, acute, varying to narrowly ovate and obtuse, narrowed at the base (rarely rounded), the margin obscurely crenate-denticulate, the cauline sessile or nearly so, similar, usually one or two alternate, the floral of 2 or 3 opposite pairs; flowers yellow, several on rather stout peduncles 2-5 cm. long; sepals 3 mm. long; petals 6-6 mm. long, usually obovate, retuse, the gland covered by a deeply notched scale .8 mm. long; achenes 1-2 mm. long, turgid but somewhat flattened, forming a subglobose cluster about 5 mm. in diameter, the style subulate, less than .5 mm. long.

In muddy ground of meadows or along streams in the open. Geyer's original specimens were taken on "plains of Coeur d'Alene" but Bentham, who described the species, used only Geyer's mss. name and the type is a Calif. coll. of Hartweg.

Nymphaeaceae. Water Lily Family.

Perennial aquatic herbs with horizontal rootstocks, rooting on the floor of shallow pools or the margins of lakes, the leaves floating (or emersed), deeply cordate or peltate. Flowers floating, with the leaves, usually conspicuous. Sepals 3-12. Petals 3-many, distinct or ~~passing~~ gradating into the sepals. Stamens 3-numerous, hypogynous or adnate to the ovary. Pistil 1, compound, or several and distinct.

and

o Leaves peltate, the petiole attached to the middle on
4 the lower side; flowers purple, inconspicuous — 1. Brasenia

o Leaves with a deep sinus at the base; flowers yellow
4 or white, very showy

2 Sinus about equal to half the length of the
6 blade, narrow, the lobes acute; petals white — 2. Nymphaea

2 Sinus 1/3 to 1/4 the length of the blade or less,
6 open, the lobes rounded, petals yellow — 9. Nymphozanthus

1. Brasenia Schreb. Water Shield.

Aquatic herbs with slender creeping rootstocks. Leaves floating, alternate, peltate. Flowers axillary, inconspicuous. Sepals and petals 5-6; ~~3 or 4~~; stamens ~~12-18~~ 20 or more; pistils 4-18, distinct, forming indehiscent pods at maturity. Seeds 1-2.

1. B. Schreberi Gmelin. → ~~Rootstocks slender~~ → stems 1-2 m. long or less, these and the underside of the leaves and petioles coated with a firm transparent jelly; leaves ~~alternate, floating~~ → 6-8 cm. long, 4.5-6 cm. wide, oval, ~~peltate~~ → the upper surface dull yellowish green, faintly veined, the veins radiating from the center, dichotomously forked, the lower surface purple, petioles 6-12 cm. long; flowers solitary in the axils on jelly coated peduncles 3-8 cm. long, the perianth segments ~~5-6~~ → 10-15 mm. long, oblong, recurved then spreading; stamens purple, ~~20 or more~~, subequal to the perianth, erect, the filaments longer than the anthers; styles purple, exserted before the stamens; ovaries oblong, 4 mm. long, the style somewhat shorter, pubescent; fruit not seen.

Priest Lake, sandy bottom in 2-5 feet of water, Ehling 8679; also observed in lagoons near St. Maries.

7. R. alismellus (Gray) Greene. Plant glabrous throughout, 10-20 cm. tall, slender, the leaves thin, not fleshy, the blades of the basal leaves elliptical, varying to spatulate or subrotund, 1-3 cm. long, entire, the petioles slender, even filiform, the cauline leaves thin, 1-2.5 cm. long, oval, usually with one alternate and a single opposite pair; flowers frequently solitary; petals 4-8 mm. long, commonly 4-6 mm. long; achenes .8-1.5 mm. long, turgid, but somewhat flattened, forming a subglobose cluster 3-4 mm. in diameter, the style subulate, less than .5 mm. long.

Meadows, Albany Falls, Sprague 235, the northernmost station for the species. Obviously closely related to R. alismaefolius.

8. R. Populago Greene. ~~Roots fascicled, somewhat fleshy~~ plants glabrous throughout, 15-40 cm. tall, blades of basal leaves 3-6 cm. long, ovate or rotund commonly subcordate at the base, entire, the petioles slender, 3-15 cm. long; cauline leaves a single opposite pair(or 3)subtending the inflorescence, sessile, oval, rounded at the base; branches of the inflorescence widely spreading; flowers variable on the same plant, the petals 3-6 mm. long, the nectary covered by a semicircular entire scale .3 mm. long; stamens ~~very~~ clavate, 2 mm. long; achenes 1-1.5 mm. long, turgid, but somewhat flattened, forming a subglobose cluster 4-5 mm. in diameter, the style subulate, less than .5 mm. long.

Divide between the St. Joe and Clearwater Rs., 1540 m., Leiberg 1216; Spokane Meadow, Epling and Kempf; Weippe, Epling; Partridge Meadow, Epling.

9. R. glaberrimus Hook. Low glabrous herb 10-20 cm. tall, roots rather fleshy, fascicled; leaves chiefly basal, fleshy, on petioles 3-6 cm. long, blades ovate, or subrotund, 1-2 cm. long, mostly entire , stem leaves 1-2, mostly obovate, sessile, irregularly 3-lobed or toothed, the lobes entire; flowers 1-3 on stout peduncles 2-5 cm. long; sepals 5 mm. long, glabrous, these and the petals obovate, the latter 6-9 mm. long, gland subtended by a V-shaped scale; fruit a subglobose cluster 1 cm. long, the achenes 1.5-2 mm. long, turgid, the style slender and curving, less than 1 mm. long.

Sandy places, Kootenai Co., Leiberg; Hope, Dunkle 334; Moscow, Bauman; Post Falls, St. John et al. 4310; Upper Priest River, Epling; Gold Hill, Daugs; Hope, Christ 691.

10. R. Eschscholtzii Schlecht. Low glabrous herbs 10-20 cm. tall, from a short scaly caudex with fibrous roots; leaves chiefly basal, on petioles 8-10 cm. long, expanded-membraneous at the base, blades 1.5-2 cm. broad, broadly reniform, or flabelliform, the lowest obscurely 3-lobed or merely 7-9-toothed, the middle teeth largest, others distinctly 3-lobed, the lobes 2-3-toothed, margins ciliolate, cauline leaves sessile, irregularly 3-parted or cleft, the lobes entire sublanceolate, widest near the middle; flowers solitary on peduncles 1-3.5 cm. long; sepals villous, 5 mm. long, yellowish, veined with green, the margins very thin; petals obovate-cuneate, 6-8 mm. long, the gland scarcely more than a groove and shallow pit, hardly covered; fruit a subcylindrical cluster 6-8 mm. long; achenes turgid, 1.5 mm. long, villous, tipped by the recurved filiform and rather weak style, 1.5-2 mm. long. (R. Hellèri Rydb.).

In subalpine meadows and crevices throughout our range, 5000-7000 feet. Jackson to Peak, 7000 ft., Sandberg et al 842 (type of R. Helleri). Benson reports (1938) var. Suksdorfii (Gray) Benson, with lobes and sinuses of basal leaves sharply acute, from Mt. Ida.

11. R. pennsylvanicus L.f. Stems erect, usually branching, 30-60 cm. tall, strongly hispid-hirsute, stout; leaves ternately divided, on hirsute petioles 3-20 cm. long, the upper sessile but similar, blades of lower leaves 8-10 cm. long, the petiolules 1-2 cm. long the leaflets 3-parted, the middle lobe larger and longer than the lateral lobes, again incised and toothed, both surfaces hirsute; flowers several on slender peduncles 2-5 cm. long, the hairs appressed, erect; sepals lanceolate, 3-4 mm. long, hispid; the petals subequal 3-4 mm. long, rotund-obovate, the scale semicircular, entire; fruit a cylindrical cluster 10-12 mm. long, 5-6 mm. wide, the achenes compressed, 2 mm. broad, beaked by a triangular style less than 1 mm. long.

Frequent in marshy ground in the open, below 3000 feet; seen only in the north.

→ Priest River Exp. Sta., 2700 ft., Epling 8648; Port Hill, Epling 10480; Granite St., Epling; East River, Epling; Rathdrum, Sandberg 732.

12. R. sceleratus L. Annual, the roots fascicled, not fleshy, the stems procumbent, 12-25 cm. long, branching, sparsely villous with fine hairs; basal leaves with hirsute-villous petioles 2-3 cm. long, the blades reniform in outline, truncate or broadly cordate at the base, 1-2 cm. wide, subpedately 5-lobed, the sinuses broad and obtuse, the lobes obovate-cuneate, again 3-lobed or toothed, the lobes or teeth very blunt, 1-3 mm. long, glabrate above, hirsute beneath; cauline leaves similar, smaller, on shorter petioles, often 3-lobed, the lobes attenuate at the base, 3-5 toothed at the apex, the stipules membranous, obliquely ovate, 3 mm. long; peduncles 1-2 cm. long; sepals orbicular, 2 mm. long, concave, thin on the margins, villous; petals yellow, orbicular, 3 mm. long; fruit cluster broadly cylindrical, 6 x 3 mm., the receptacle clavate, villous, achenes 1 mm. in diameter, turgid, with an obscure broad margin, smooth, the beak minute.

Sandy river bottom, Bonners Ferry, Epling 10460; Sandpoint, Christ 1186. Perhaps the native var. multifidus Nutt. rather than naturalized true European sceleratus.

13. R. Douglasii Howell ~~Bongardi Greene~~ Roots fascicled, rather fibrous; stems 30-60 cm. tall, slender, simple or widely branching in the inflorescence in vigorous forms, hispid with spreading hairs and usually glaucous; basal leaves on hispid petioles 5-30 cm. long, the blades reniform in outline, 2.5-15 cm. broad, cordate at the base, the sinus wide, the lobes rounded, three lobed or parted, the lobes, especially the middle, cuneate, shallowly incised or merely toothed, hirsute on both surfaces, the lower paler; cauline leaves smaller, the lobes nearly or quite simple, acute, the petioles 1-2 cm. long; flowers few in a single terminal cyme, pedicels 1-3 cm. long; sepals lanceolate or oblong, recurved, subequal to the petals; hispid; petals 2-3 mm. long, spatulate or obovate, the gland subtended by a recurving spur; fruit a globose cluster 5-6 mm. in diameter, achenes 2-2.5 mm. long, strongly flattened, thinly hispidulous, the style subequal, strongly curved and hooked, slender; receptacle hispidulous. → (R. tenellus Nutt.).

Common in meadows or marshy places in woods and bottoms throughout our region, 2500-6500 feet; quite variable in habit and size in the same community; robust forms nearly glabrous may occur. Our plants seem to be more or less transiti[onal] toward R. Bongardi Greene, to which this species is manifestly allied.

R. acris ... Achenes flattened, with a short somewhat curved beak, in globose clusters. Occasional weed introduced from Europe.

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14. R. Macounii Britton. Stems 30-50 cm. tall, more or less reclining, hispid with spreading hairs; basal leaves triternate, the blades 5-6 cm. long, the leaflets cuneate at the base, ternately lobed or parted and toothed above the middle, nearly glabrous above, hispid beneath, petioles 15-25 cm. long, [redacted] hispid; cauline leaves [redacted] reduced [redacted] flowers yellow in terminal cymes of 2-4, peduncles 3-5 cm. long, slender, the hairs appressed, erect; sepals 3.5 mm. long, ovate, membranous, with a few stiff hairs on the back, soon deciduous; petals 4-5 mm. long, rotund-obovate, strongly veined; achenes 3 mm. long, compressed, hardly marginate, the style half the length of the body, straight or somewhat curving at the tip, receptacle hispidulous, the cluster globose or nearly so.

Along Thoroughfare, Upper Priest R. ~~Eyling 7589, Sig~~, Priest River Exp. Sta., 2500 ft. ~~Eyling 3659~~; Sohon's Pass, 1700 m. ~~Leiberg 1472~~; Cocolalla. Christ 1596

15. R. maximus Greene. →Stems 50-90 cm. tall, or more, from a fascicle of rather fleshy roots, retrorsely brownish-hirsute or hispid, fistulous, weak; foliage variable, basal leaves ternate or pinnately 5-foliolate, the blades ovate in outline, 12-25 cm. long, the lower pair of leaflets sessile or petiolate ~~petiolules subequal to the blades~~, alternately lobed or parted, the lobes cuneate, incised and toothed, the teeth spreading somewhat, upper leaves similar but triternate, all coarsely hirsute, petioles 15-40 cm. below, reduced above; flowers yellow in sprawling cymes, peduncles 5-10 cm. long, sepals membranous, 4-5 mm. long, villous-pilose, soon deciduous; petals commonly 10-12 mm. long, broadly obovate, the scale flabelliform, 1.5 mm. long, 2.5-3 mm. broad; achenes 3-4 mm. long, strongly compressed, margined, the style nearly equal to the body and straight, not hooked; cluster globose, 1.5-2 cm. in diameter. (~~R. platyphyllus Nelson~~ → orthorhynchus var. platyphyllus Gray).

Occasional in meadows or marshy ground below 3000 feet.

2. Clematis L.

Perennial herbs, erect or vine-like; leaves opposite. Sepals commonly 4, petal-like. Petals wanting or minute. Stamens numerous. Pistils numerous. Fruit an achene, tailed by the persistent, plumose style, showy in fruit.

Plants erect, the leaf segments linear, oblanceolate, 2-4 mm. broad — 1. C. hirsutissima

Plants climbing or sprawling, vine-like, the leaf segments ovate, 1-3 cm. broad

Flowers white, numerous in axillary cymose panicles; leaflets mostly 5 — 2. C. ligusticifolia

Flowers blue, solitary in the axils; leaflets 3 — 3. C. columbiana

1. C. hirsutissima Pursh. Leather Flower. Perennial with tough horizontal rootstock, the stems erect, 40-50 cm. tall, tufted and numerous, forming compact, globose plants, hirsute or villous; leaves connate and sheathing at the base, triangular-ovate in outline, 5-7 cm. long [redacted], 10-12 cm. long in fruit, ternate, then once or thrice pinnate, the segments 1-2 cm. long, 1-4 mm. broad, linear-oblanceolate, obtuse, villous, [redacted] the blades of the lowermost leaves much reduced, ternate; flower solitary on a terminal peduncle 3-6 cm. long, [redacted] 20-30 cm. long in fruit, thinly villous; sepals 3-3.5 cm. long, erect not spreading, oblong, brown and purple, veined and woolly outside, the tips dilated; stamens 2 cm. long, the anthers yellow, 5 mm. long, scarcely wider than the filaments; styles silky-hairy; achenes obliquely ovate, 5-6 mm. long, silky-hirsute, the styles 3-5 cm. long, the clusters globose, smoky, 8-9 cm. in diameter. (C. Douglasii Hook.).

Along roadways and in meadows in the grasslands.

2. C. ligusticifolia Nutt. White Clematis. Low sprawling plant, woody at the base, stems [redacted] commonly 1-2 m. [redacted] more, sparingly pilose or glabrous; leaves pinnately compound, the leaflets 3-7, commonly 5, 3-4 cm. long, the terminal commonly largest, ovate or lanceolate in outline, merely toothed or 2-3-lobed, acute or obtuse, rounded at the base, [redacted] glabrous above, pale appressed-silky when young, becoming glabrous; flowers polygamous or monoecious in axillary cymose panicles; bracts linear-oblong 4-5 mm. long; pedicels 1.5-2 cm. long, pubescent; sepals white, silky-tomentulose, oblong or oblanceolate, 7-8 mm. long, soon reflexed; perfect flowers with a single whorl of stamens, these usually sterile; styles silky plumose; staminate flowers with numerous stamens, the anthers 1 mm. long; achenes 2 mm. long, the mature style 3-5 cm. long, hair-like, plumose, the cluster commonly 5-6 cm. broad. (C. brevifolia Howell.).

Occasional throughout our range in the warmer valleys below 3000 feet, sprawling over rocks and low shrubbery in the open; [redacted]

3. C. columbiana (Nutt.) Torr. et Gray. Blue Clematis. → Stems woody, commonly several meters long, sparingly silky when young, glabrate; leaves trifoliolate, leaflets 4-6 cm. long, obliquely ovate-lanceolate to ovate, acuminate, rounded or subcordate at the base, silky pubescent when young, glabrate, the lower surface glossy in age, toothed or subentire, the petiolules .5-2 cm. long, petioles 5-8 cm. long; flowers solitary in the axils, on peduncles 10-20 cm. long; sepals blue, 3-5 cm. long, ovate-lanceolate, lightly acuminate, rounded at the base, glabrous; stamens about 1 cm. long, the filaments flattened, ~~the outer somewhat longer and some sterile, the margin~~ → ciliolate; styles silky; achenes 2.5-3 mm. long, the mature styles 4-7 cm. long, filiform, drooping, tinged with lavender en masse, plumose, the clusters about 8 cm. broad. → (Atragene columbiana Nutt., A. grosseserrata Rydb.).

Occasional throughout our region, more abundant in the south; climbing over windfall and shrubbery in rather dry woods, 3000-6500 feet; rarely in the open and infrequently as low as 2000 feet.

3 Anemone L. Windflower.

Low perennial herbs, the stems and basal leaves from short, sometimes tuberous rootstocks. Cauline leaves commonly 3, forming a whorl subtending the inflorescence. Flowers solitary or in umbels. Sepals 4, numerous, petal-like. Petals wanting. Stamens numerous. Pistils numerous. Achene with or without a plumose tail formed from the persistent style.

Petioles of cauline leaves 1.5-3 cm. long — 1. A. Piperi

Cauline leaves sessile or nearly so

Sepals 2.5 cm. long; fruit a globose or oval cluster of plumed achenes 5-10 cm. long — 2. A. occidentalis

Sepals 1-1.5 cm. long; fruit a dense, woolly glomerule 1-3 cm. broad, the achenes woolly, but without a plumose tail

Sepals bluish (rarely white); persistent style of achene subequal to it; flower solitary — 3. A. baldensis

Sepals crimson (rarely white); persistent style of the achene half its length; flowers mostly 3, umbellate — 4. A. multifida

1. A. Piperi Britton. Stems erect, glabrous, 10-30 cm. tall, from horizontal or vertical rootstocks, basal scales scarious, glabrous; basal leaf solitary or wanting, blade reniform in outline, trifoliolate, the segments rhombic-obovate or ovate, subcuneate at the base, the lateral segments two-lobed, resembling two leaflets, toothed above the middle, the teeth obovate or ovate, lightly acuminate, thinly hirsute, then glabrous, ciliate, petioles 1/2 to 2/3 the length of the stem; cauline leaves similar but somewhat larger, the petioles 1.5-3 cm. long, expanded at the base; flowers solitary; sepals 5 (7), white, oval, 8-20 mm. long, narrowed below; anthers scarcely 1 mm. long; carpels about 25, silky-villous, becoming narrowly ovate, 2.5-3 mm. long, attenuate into a style 1-1.5 mm. long, the clusters globose.

Frequent in the southern part of our region at all elevations, chiefly in shaded woods, but also in subalpine meadows, flowering at edge of snowbanks. Type coll. taken by C. V. Piper in Latah Co. in 1893.

2.

A. occidentalis Wats. ~~Western Anemone.~~ Stems erect, silky, 30-50 cm. tall, stout, ~~from a thickened crown, 1-1.5 cm. in diameter,~~ clothed with the persistent leaf bases, basal scales densely silky; basal leaves 1-several, the blades 6-8 cm. long, triangular-ovate in outline, 3-5 pinnate, the segments again cleft and divided, the ultimate lobes 1.5-2 mm. wide, lanceolate, acute, both surfaces long-silky when young, becoming nearly glabrous, petioles about twice the length of the blades, expanded and clasping at the base, cauline leaves similar but sessile; flowers cup-shaped, solitary on silky peduncles 4-6 cm. long, lengthening in fruit to 15-20 cm.; sepals 5, 2.5 cm. long, silky on the outer surfaces, white, tinged with blue near the base on the under side, oval, narrowed at the base; ~~cup-shaped;~~ anthers yellow, 1 mm. long on slender filaments; styles silky; fruit cluster very conspicuous, oval or rotund, in outline, 5-10 cm. long, the achenes 4 mm. long, the plumose tail 4-5 cm. long, reflexed. (Pulsatilla occidentalis (Wats.) Freyn.).

Subalpine meadows and the protected crevices of rocky peaks, 5000 to 7400 feet or more, frequently forming conspicuous communities; throughout our range; flowers at the edge of snow banks, ~~enlarging by maturity.~~

3. A. baldensis L. → Stems 10-20 cm. tall, slender, from a branching rootstock 4-5 cm. in diameter; basal scales scarious, glabrous; basal leaves several, tufted, blades 2.5-3 cm. long, triternate, the segments cuneate-obovate in outline, usually 3-cleft, the lobes again incised, the ultimate segments 6-10 mm. long, 2-3 mm. wide, oblanceolate-oblong, more or less obtuse, rather sparingly silky-villous when young, becoming glabrous, petioles ~~about 6 times the length of the blades~~ expanded and clasping at the base, more or less villous, cauline leaves ~~similar,~~ sessile; flowers solitary on peduncles 5-6 cm. long, becoming 10-12 cm. long in fruit; sepals 5-8, bluish and silky on the outer surface, oval or oblong, 1-1.5 cm. long, narrowed at the base, anthers 6-8 mm. long, on slender filaments; styles silky; achenes 2 mm. long, obliquely ovate, strongly flattened, densely woolly, the style subequal, glabrous, the cluster ovate, compact, 1-1.5 cm. in diameter. (A. Drummondii Wats.). =1

Rare in our region; found in alpine situations only on the highest peaks in rock crevices soon after snow has gone. Snowy Top Mt., 7400 ft.; Stevens Peak, 6450 ft.

4. A. multifida Poir. var. globosa (Nutt.) Ulbrich. Stems commonly 20-30 cm. tall, sometimes 50 cm., from a branching rootstock, ~~5-8 mm. in diameter~~; basal scales scarious but more or less silky; basal leaves several, tufted, blades 3-4 cm. broad, rotund-reniform in outline, more or less silky-villous, tufted, the lobes ovate-cuneiform in outline, deeply 3-cleft, the lobes again incised, the ultimate segments 8-14 mm. long, oblong, subacute, the petioles ~~about 6 times the length of the blades~~ expanded and clasping at the base, more or less villous or pilose; cauline leaves ~~similar,~~ sessile; flowers ~~solitary or more~~ often in umbels of 2-3, on peduncles 5-20 cm. long; sepals oval, 10-15 mm. long, usually 5-6, silky on the outer surface, crimson (yellowish or white); anthers 6-8 mm. long on slender filaments; styles silky; achenes strongly flattened, triangular-ovate, 1.5 cm. long, densely woolly, the style half as long, hooked at the tip. =

Subalpine in rock crevices; known in our region only from ~~this station~~ → north → near Lake Pend Oreille, Leiberg.

4. Actaea L. Baneberry.

Erect perennial herbs. Leaves alternate, bi- or tri-ternately compound. Flowers small, white, in a terminal spike-like raceme. Sepals commonly 4, petal-like, quickly deciduous. Petals several, indefinite in number, resembling sterile stamens or wanting. Stamens numerous, forming the showy part of the flower. Pistil 1. Fruit a glossy berry.

1. A. arguta Nutt. Stems one or two, 60-90 cm. tall, from a short horizontal slender rootstock; leaves 1-2, ovate to reniform in outline, 30-50 cm. long, ternately divided, the divisions again divided, bearing either 3-5 leaflets or frequently bipinnately divided, the ultimate segments bearing 3-5 leaflets; leaflets 3-6 cm. long, ovate to lanceolate, irregularly toothed or incised, the terminal commonly obovate, 1-3 lobed, cuneate to truncate, glabrous; raceme dense and spike-like, 2-4 cm. long, frequently elongating in fruit to 15 cm., subtended by a small leaf, lightly pubescent; pedicels white, 8-10 mm. long; petals white, 3-4 mm. long, spatulate, often wanting; anthers less than 1 mm. long, the filaments slender, 4-8 mm. long, dilated above; berry 5-8 mm. long, bright red or pure white, oval, highly polished, the pedicels 1-2 cm. long, slender; seeds 3 mm. long, strongly compressed, in two rows along the suture. (A. eburnea Rydb.).

Common throughout our region in rather moist woods and shaded stream bottoms, 2500 to 5000 feet.

5. Coptis Salisb. Goldthread.

Herbs with slender rootstocks. Leaves basal, ternately divided or compound. Flowers borne on a short scape, solitary or umbellate. Sepals 5-7, petal-like, linear, hooded above; stamens numerous; pistils 3-12, shortly stipitate, forming in fruit a whorl or umbel of leathery follicles.

1. C. occidentalis (Nutt.) T. & G. Low glabrous perennial, the rootstocks 3-8 cm. long, 2-5 mm. in diameter, golden yellow when peeled; leaves 2-3, reniform in outline, the leaflets leathery, rather glossy, rotund-ovate, commonly 3-lobed, toothed, cuneate or cuneate-rounded to obliquely cordate at the base, petioles about twice the length of the blades; flowers commonly 3, umbellate, early deciduous; follicles commonly 8, 12 mm. long, spreading and curving upward, veiny; seeds olivaceous, elliptical, blunt, 2 mm. long, lightly rugose longitudinally. (Chrysocoptis occidentalis Nutt.).

Common throughout our region in rather dry woods, chiefly below 4000 ft.; flowers in April, the pods being quickly formed.

6. Caltha (Rupp.) L.

Perennial herbs with short vertical rootstocks and fascicled stout roots. Leaves mostly basal, rather fleshy, subentire, more or less cordate at base. Flowers solitary or several on a scapose or leafy stem. Sepals petaloid, in ours white or pink, 5-15 in two series. Petals wanting. Stamens numerous. Carpels several, forming follicles in fruit.

1. C. leptosepala DC. Marsh Marigold. Leaves all basal, petioles 6-12 cm. long, rather stout, blades suborbicular to oval, 3-6 cm. long, glabrous, the lobes rounded, overlapping, sinuately dentate-crenate, the teeth commonly callous-tipped; peduncle stout, 5-15 cm. long; sepals 8-10, oblong, 8-12 mm. long, 2.5-4 mm. wide, the inner narrower; stamens 3-4 mm. tall, yellow, the filaments subequal to or longer than the anthers, and somewhat narrower; pistils 4-6, erect, distinct, follicles spreading, about 12 mm. long, shortly stipitate, beaked by the persistent style.

Rare in sphagnum bogs at high elevations. Snow Peak, 6000 ft.; near Oxford R. S., 5000 ft.

7. Trollius L. Globe Flower.

Low perennials from short rootstocks. Leaves basal and cauline, palmately divided, the basal leaves long-petioled, the cauline sessile, subtending the flower, both sheathing at the base. Flower solitary on a short peduncle. Sepals 5-15, petal-like. Petals 5-8, shorter than the stamens. Stamens numerous. Pistils several. Fruit a cluster of follicles.

1. T. laxus Salisb. var. albiflorus Gray. ——→Stems 10-40 cm. tall, ~~from short rootstocks, the roots fascicled~~→ the old leaf bases persistent; leaves and stems from a sheathing scale 2-4 cm. long, the lowest cauline leaf frequently scale-like; basal leaves sheathing at the base, commonly 2 ~~on petioles 5-30 cm. long~~→, blades pentagonal in outline, 5-lobed to the base, the lobes obovate-oblong, obtuse or wedge-shaped, 2-3-lobed to the middle, irregularly serrate above the middle, the teeth apiculate, stem leaves 2, alternate or appearing nearly opposite, ~~shortly petioled or sessile, similar to the basal~~→; ~~flower solitary on~~→ peduncle 3-5 cm. long, 15-20 cm. in fruit, erect; sepals 5-8, 2-2.5 cm. long, sordid-white, spreading, obovate or oblanceolate, obtuse; petals oblong, 3 mm. long; anthers linear, 2 mm. long, on hair-like filaments; follicles 15-20, erect, about 1 cm. long, lightly joined at the base, the stubby persistent style recurving somewhat; seeds 1.5 mm. long, oblong-elliptical, lightly rugose longitudinally, black. ——→(T. albiflorus Rydb.).

Frequent in marshy ground near snowbanks and along subalpine streams; blooms very early.

8. Aquilegia L. Columbine.

Perennial herbs with short horizontal rootstocks. Leaves chiefly basal, bi- or tri-ternately compound. Flowers showy, solitary on the branches of the inflorescence. Sepals 5, plane, petal-like, similar; petals 5, similar, produced backward into a long saccate spur commonly longer than the sepals. Stamens numerous, the innermost sterile, expanded and chaffy, forming a sheath around the ovary. Pistils commonly 5. Fruit a cluster of follicles.

1. A. flavescens Wats. ~~Yellow Columbine.~~ Stems 30-100 cm. tall from short rootstocks, ~~terminating in a tap root and covered with old leaf bases,~~ glandular-pubescent above; basal leaves several, biternate, the leaflets rotund-cuneiform, 2-2.5 cm. in diameter, variously 2-3 lobed, the lobes again incised or toothed, the teeth blunt, glabrous and rather pale, shortly stipitate or subsessile, ~~the petiolules 2-3 cm. long~~, petioles 8-20 cm. long, cauline leaves trifoliate, the segments cuneate or ~~ob~~ (the uppermost) oblong, ~~sometimes lobed sessile~~; flowers pendulous; sepals narrowly elliptical, oval or broadly ovate, 1.5-2.5 cm. long, mostly acute at the apex, glandular on the margins, attenuate at the base, whitish or yellow to deep rose-color; lip of the petals clear yellow, 6-9 mm. long, rounded-truncate, 4-5 mm. wide at the throat, the spur 15-18 mm. long, glandular-pubescent, narrowed evenly save at the tip which is somewhat incurved; ovary glandular-hirsute; follicles erect, 2-3 cm. long, lightly joined at the base, sparsely hairy, tipped by the persistent styles; seeds dull black, 2 mm. long, lanceolate in outline, longitudinally rugose.

Locally abundant throughout our region in subalpine meadows and moist slopes 5000 to 7000 feet, rarely as low as 3000 feet.

A. formosa Fisch. Sepals dark red, 21-26 mm. long, petals yellow, 2-5 mm. long, the spurs red, slightly shorter than the sepals. "Between St. Joe and Clearwater R. (form near flavescens)" Payson, U.S. Nat. Herb. 20: 142. In Custer Co. plants completely transitional betw. this and above species displace both, ~~parents~~.

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9. Delphinium. L. Larkspur.

Perennial herbs often with tuber-like, fascicled roots. Leaves alternate, palmately lobed or divided, variable on the same plant. Flowers showy, blue in our species, in terminal sometimes compound racemes. Sepals 5, petal-like, the blades ~~sub~~similar, the uppermost sepal prolonged into a spur as long as or longer than the blade. Petals 4, blue or cream-colored, the anterior obliquely clawed, sometimes auricled near the base of the blade, commonly lobed, the posterior thickish and rigid, ascending under the upper sepal and pro~~longed~~ fected into the spur. Stamens numerous. Pistils commohly 3, forming a cluster of follicles.

0 Flowers infrequently more than 10; plants low, 15-40 cm. tall;
  4 leaves infrequently more than 5 — 1. D. Nelsoni

0 Flowers numerous; plants 60-90 cm. or more; leaves numerous
  2 Stemsusually strict, unbranched; pedicels erect, the
    6 spur horizontal, the flowers pressed against the stem
      4 Lower stem and leaves puberulent with fine recurved
        8 Sometimes hairs or ~~seldom~~ glabrous; leaves more or less dimorphic, the lower pinnatifid, the upper deeply pectinately divided into linear divisions — 2. D. Burkei
      4 Lower stem and leaves villous and somewhat glandular
        8 with loose spreading hairs; leaves subequal, all pinnatifid into expanded rather blunt lobes — 3. D. cyanoro
  2 Stemsbranched, especially in the inflorescence; pedicels
    6 ascending, spreading away from the rachis
      4 Sepals 1.5-2 cm. long; spur subequal — 4. D. glaucescens
      4 Sepals 7-8 mm. long, the spur 12 mm. long — 5. D. occidentale

1. D. Nelsoni Greene. Stems slender, laxly erect, 20-40 cm. tall, from tuber-like rootstocks, mostly puberulent in the upper parts with recurving ~~non~~-glandular hairs, or ~~now~~ glabrous, sometimes ~~new~~ glandular with spreading hairs or with both glandular and ~~non~~-glandular hairs; leaves few, the lower on petioles 5-12 cm. long, the blades 4-6 cm. broad, tri-ternate, the linear unequal bluntish lobes 1-3 mm. wide, the upper leaves shortly petioled or sessile, commonly 3-cleft nearly to the base, the segments entire; 3-15-flowered, the pedicels 1-3 cm. long, usually curving upwards, the lowermost longest; sepals a rich blue, or bluish-purple, elliptical-oblong or oval, 12-20 mm. long, 4-8 mm. wide; petals bluish or sometimes cream-colored and more or less tinged with blue, the anterior ovate, their blades 7-10 mm. long, narrowed to a claw 4-5 mm. long, cleft 1/3-1/2 their length, the lobes blunt, auricled, with a central tuft of hairs, the posterior 6-8 mm. long, entire, the spur 12-20 mm. long, straight or curving near the tip; follicles erect, curving outwards, 10-12 mm. long, pubescent or glabrous; seeds longitudinally lineolate, with a circular margin on the flattened apex.

In thin gravelly soil throughout our region but never abundant; poisonous to stock but hardly of sufficient abundance to be a serious factor.

2. D. Burkei Greene. Stems 50-80 cm. tall, usually strict and virgate, from a cluster of tuber-like ~~iform~~ roots, glabrate below, lightly puberulent with close recurved hairs above or even somewhat glandular-villous in the inflorescence but not markedly so; lowermost leaves on slender petioles 4-8 cm. long, the blades 4-5 cm. broad, triangular or fanshaped, the primary divisions about 5, narrow, long-cuneate, deeply divided into several ultimate segments, these narrowly lanceolate to sublinear, attenuate and acute, the upper leaves (5) succesively reduced to a few linear pinnatisect or comb-like divisions, thus somewhat unlike the lowermost leaves, all leaves ascending or even appressed

to the stem; flowers numerous, rather close-set, in a narrow ~~spiciform~~ spike-like raceme 15-20 cm. long, the pedicels erect; sepals ovate to oblong, 6-10 mm. long, obtuse, usually bright blue (in one race pale blue), rather uniformly puberulent, the spur 8-12 mm. long, slender, nearly horizontal; petals purplish, ovate, the blade of anterior petals thinly villous with a few long hairs; follicles 8-12 mm. long, erect, glandular-pubescent, seeds 1.0 -1.5 mm. long, dark straw-color, the 3 angles narrowly margined. (D. simplex Dougl., ~~preoccupied name~~).

Open grassy places, Thatuna Hills, Epling & Houck 9200. The type of D. simplex, ~~taken~~ found by Douglas, is the pale-blue-flowered race. Plants with puberulent to wholly glabrous lower stems and leaves, the raceme densely crowded, 30-45-flowered ~~is~~ are subsp. distichiflorum (Hook.) Ewan, the type being Geyer 420 from high plains of Spokane and Nez Perces; ~~It is~~ apparently infrequent.

3. D. cyanoreios Piper. Stems erect, 40-100 cm. tall, more or less strict, from heavy tuber~~iform~~-like roots, usually more or less velvety-glandular with shining yellow hairs throughout but especially abundant on the rachis; leaves on petioles 6-10 (or 15) cm. long, the blades cuneate-rounded in outline, 3-5 cm. broad, pinnatifid into about 3 primary divisions, these subdivided into crowded ascending rather broad obtuse lobes, each lobe commonly tipped with a whitish mucro, the uppermost leaves differing but little and unreduced, thus all the leaves essentially alike and strongly ascending; flowers many, rather loosely arranged in the elongated raceme, this rarely ~~laterally~~ branching at the base, 10-20 (or 35) cm. long, the pedicels erect; sepals ovate, evenly broadly so, 8-14 mm. long, acute, dark blue, pubescent with either ~~now~~ glandular hairs, or ~~now~~ short recurving crisp hairs, or with a patch of hairs at tip, the spur 12-18 mm. long, stout, attenuate; petals whitish, venose,

blue-tinged, the blade of anterior petals densely white-villous with interlacing hairs; follicles 12-17 mm. long, usually densely glandular-villous, seeds essentially bifacial, 1.0-1.5 mm. long, the angles and summit narrowly white-margined.

Grassy roadsides, sagebrush flats or dry floor of yellow pine forests. Little Bear Ridge near Troy, Epling; Craig Mts. (fide Piper).

4. D. glaucescens Rydb. Stems commonly 1 m. or less tall, glabrous below, pubescent above; leaves variable, the lower on petioles 30 cm. long or more, the blades rotund-reniform in outline, 8-10 cm. broad, commonly divided into 5 primary cuneate segments, the segments incised and toothed above the middle, the ultimate segments narrowly lanceolate, acute, both surfaces glabrate, or the margins ciliolate, the upper cauline leaves sessile or nearly so, 3-5 foliolate, the segments linear-lanceolate, commonly entire; flowers in an open raceme 30-40 cm. long, the pedicels arcuate, pubescent, the lowermost 4-5 cm. long infruit; flowers deep blue, sparsely villous throughout, the sepals ovate-lanceolate, acute or acuminate 1.5-2 cm. long, the anterior petals ovate, blades 1 cm. long, incised, the lobes parallel, the claw 5 mm. long, the posterior pair about 8 mm. long, oblong, spur 1.5-2 cm. long, stout; follicles 18 mm. long, pubescent, recurving and divergent; seeds not seen.

Santianne Cr. bottoms, 2950 ft., Leiberg 1031.

5. D. occidentale Wats. Stems several from a stout woody rootstock and stout taproot, 1-1.5 m. tall, glabrous below, ~~spreading~~ glandular-hispid in the inflorescence; leaves reniform in outline, 10-12 cm. broad, parted into 5-7 primary cuneate lobes, these again incised and toothed at the apex, the teeth acute or obtuse, with a terminal callous, both surfaces glabrous or nearly so, the upper dark green; flowers in a showy panicle 30-50 cm. long, the bracts linear, .5-2 cm. long, pedicels straight, ascending, spreading

glandular, 1.5-2.5 cm. long; sepals deep purple, rose-color, blue or nearly white, 7-8 mm. long, oblong, obtuse, with a greenish saccate depression near the apex, more or less connivent, the uppermost ovate and rather acute, the spur 12 mm. long, nearly straight, wrinkled transversely, all sparingly glandular; upper petals mostly white, tinged with blue, bidentate, the anterior

blue or white, ovate, bifid, the blade 3-4 mm. long, villous, the claw subequal; follicles erect, spreading somewhat above the middle, glabrous and shining, strongly veined, 15 mm. long, seeds about 3 mm. long.

Fish Lake, 6000 ft., Epling & Houck 9529; Kirkwood 1887.

10. Aconitum L. Monkshood.

Erect perennial herbs. Leaves alternate, palmately lobed. Flowers very showy, in terminal, bracted racemes. Sepals 5, petal-like, the upper forming an arching hood. Petals ~~apparently~~ 2, concealed within the hood, each narrowed to a slender claw which is terminating in a nectary, the three lower ones wanting or rudimentary. Stamens numerous. Pistils 3-5, forming as many follicles in fruit.

1. A. columbianum Nutt. Rootstocks small and tuberous; stems commonly 1-1.5 m. tall, simple to the inflorescence, crisp-puberulent ~~in~~ below, glandular-hirsute above; leaves kidney-shaped or rotund in outline, 6-12 cm. broad, palmately 5-7-lobed nearly to the base, the lobes wedge-shaped, incised and toothed near the apex, softly pubescent, especially beneath; flowers deep blue, racemes 15-40 cm. long, subtended by subfoliar or linear bracts; pedicels usually curving upwards, 2-5 cm. long, glandular; ~~the~~ upper sepal as long as 28 mm., strongly arched and hooded, the hood often projected as much as 10-11 mm. long which into a beak resembling a visor, ~~now nearly wanting, now 10-11 mm. long,~~ the lateral sepals obovate, 20 mm. long, the lower oblong-lanceolate, 16-17 mm. long, unequal; petals conforming to the shape of the hood and concealed within it, the claws 10-12 mm. long; stamens 5 mm. long; pistils commonly 3; follicles distinct, 15-18 mm. long; seeds 3-3.5 mm. long, comma-shaped, 3-angled, margined along 1 angle, otherwise as though hung with ruffles.

Common throughout our region in moist woods, subalpine meadows and rich bottoms, 2500-7000 ft. A white-flowered form ~~ochroleucum (A. Nels.)~~ ~~St. John also~~ occurs sometimes.

11. Thalictrum L. Meadow Rue.

Tall perennial herbs from short rootstocks. Leaves bi- or tri-ternately compound, the cauline leaves alternate, the petioles dilated and clasping at the base. Flowers in a terminal raceme or panicle, dioecious or polygamous. Sepals 4-5, greenish, petal-like, petals wanting. Stamens numerous, the anthers linear, mucronate, the filaments hair-like. Pistils 4-15. Fruit an inflated achene, bearing the persistent slender style.

Leaves elliptical to obovate in outline, 1-3 lobed, the lobes entire; body of achene 3-3.5 mm. long, plump — 1. T. purpurascens

Leaves rotund in outline, 3-lobed, the lobes bluntly toothed; body of achene 4-5 mm. long, flattened — 2. T. occidentale

1. T. purpurascens L. Stems 60-80 cm. tall, erect, glabrous; leaves ternate, then once or twice pinnate, the leaflets sessile or on short petioles, firm, glabrous, 1.5-2.5 cm. long, frequently elliptical and subentire or bearing a single lobe, more commonly obovate, 3-lobed above the middle or near the apex, rounded or subcordate at the base, the lobes blunt, mucronate, the veins on the lower surface prominent; flowers both perfect and unisexual; achenes 3-3.5 mm. long, plump, the persistent style half again as long, ribs 8-9, rather corky, the sinuses acute.

Clark Fork Valley below Weeksville, 2100 ft., Leiberg 1576; Sandpoint, Christ 204; Pack R., Christ 1546.

2. T. occidentale Gray. Stems .5-1 m. tall, slender, glabrous or minutely glandular-puberulent, fistulous; leaves commonly triternate, or the ultimate segments pinnate, leaflets orbicular-cuneiform in outline, truncate, cuneate or the terminal ones even cordate at the base, shallowly 3-lobed, the lobes

toothed, the teeth blunt, glabrous and somewhat glaucous, the lower paler and minutely puberulent or glabrous; flowers dioecious, panicles 10-15 cm. long; sepals of staminate flowers 3-4 mm. long, oval, whitish, spreading; stamens pendant, 8-10 mm. long; sepals of pistillate flowers green, 2 mm. long, soon dropping; pistils commonly 8-12, the styles 3 mm. long, purple, persistent; achenes 5-7 mm. long, 2-2.5 mm. wide, narrowly elliptic, acute at both ends, sessile, recurved in fruit, flattened laterally, with 8-10 longitudinal ~~costate veins~~ ribs; seeds 4-4.5 mm. long, .5 mm. wide, dull black, curving, rugose, with a single longitudinal ridge, thinly and minutely glandular with stalked glands.

Common throughout our region in meadows and moist, open places in woods, or along streams, 2500-5000 ft.

12. Trautvetteria F. & M. False Bugbane.

Tall perennial herbs with horizontal rootstocks. Leaves palmately lobed, chiefly basal, the cauline alternate. Flowers numerous in terminal corymbs. Sepals 3-5, caducous. Petals wanting. Stamens numerous, forming the conspicuous part of the flower. Pistils numerous. Fruit a globose cluster of lightly inflated achenes.

1. T. grandis Nutt. ~~False Bugbane.~~ → Stems 50-60 cm. tall or more, from short rootstocks, glabrous; basal leaves reniform in outline, 15-30 cm. broad or more, palmately 6-9 lobed to the middle, the lobes subequal, cuneate, acute and irregularly toothed above, the teeth slender, lightly acuminate, the lower surface sparsely villous or glabrate, petioles 10-30 cm. long or more, the cauline 1 or 2, similar but smaller, often divided into 3 or more segments, sessile; ~~flowers numerous in a terminal~~ → corymb 5-15 cm. broad, pubescent in the upper parts; sepals rotund-oval to obovate, 5-6 mm. long; stamens white, 6-7 mm. long, spatulate, the anthers tiny; achenes 8-15 in a single flower, plump 3 mm. long, [illegible], each with a dorsal and ventral and 4 lateral veins, tipped by the short recurving style; seeds obovate, smooth, 1 mm. long.

Common throughout our region, mostly below 4000 feet, in moist shaded stream bottoms; grazed by sheep in early spring and summer.

Nymphaeaceae. Water Lily Family.

Perennial aquatic herbs with horizontal rootstocks, rooting on the floor of shallow pools or the margins of lakes, the leaves floating (or emersed), deeply cordate or peltate. Flowers floating, with the leaves, usually conspicuous. Sepals 3-12. Petals 3-many, distinct or ~~pasing~~ gradating into the sepals. Stamens 3-numerous, hypogynous or adnate to the ovary. Pistil 1, compound, or several and distinct.

0 Leaves peltate, the petiole attached to the middle on
4 the lower side; flowers purple, inconspicuous — 1. Brasenia

0 Leaves with a deep sinus at the base; flowers yellow
4 or white, very showy

2 Sinus about equal to half the length of the
6 blade, narrow, the lobes acute; petals white — 2. Nymphaea

2 Sinus 1/3 to 1/4 the length of the blade or less,
6 open, the lobes rounded, petals yellow — 3. Nymphozanthus

1. Brasenia Schreb. Water Shield.

Aquatic herbs with slender creeping rootstocks. Leaves floating, alternate, peltate. Flowers axillary, inconspicuous. Sepals and petals 5-6; ~~3 or 4~~; stamens ~~12-18~~ 20 or more; pistils 4-18, distinct, forming indehiscent pods at maturity. Seeds 1-2.

1. B. Schreberi Gmelin. ~~Rootstocks slender~~ stems 1-2 m. long or less, these and the underside of the leaves and petioles coated with a firm transparent jelly; leaves ~~alternate, floating~~ 6-8 cm. long, 4.5-6 cm. wide, oval, ~~peltate~~ the upper surface dull yellowish green, faintly veined, the veins radiating from the center, dichotomously forked, the lower surface purple, petioles 6-12 cm. long; flowers solitary in the axils on jelly coated peduncles 3-8 cm. long, the perianth segments ~~5-6~~ 10-15 mm. long, oblong, recurved then spreading; stamens purple, ~~20 or more~~, subequal to the perianth, erect, the filaments longer than the anthers; styles purple, exserted before the stamens; ovaries oblong, 4 mm. long, the style somewhat shorter, pubescent; fruit not seen.

Priest Lake, sandy bottom in 2-5 feet of water, Epling 8679; also observed in lagoons near St. Maries.

2. Nymphaea. Pond Lily.

Perennial aquatics with usually creeping rootstocks. Leaves floating, sometimes emersed, with a deep, narrow sinus in ours, on long slender petioles. Sepals 4, green. Petals numerous, in several series, showy, passing into staminodia. Stamens numerous, epigynous. Ovary many chambered, the stigmas disclike, radiating. Pod spongy, maturing under water. Seeds with a membranous aril.

1. N. tetragona Georgi. Rootstock short, woolly; leaves tufted at the apex of the rootstock, the petioles 2.5-4 mm. in diameter, the blades obovate to oval in outline, the sinus half the length of the blade or more, the margins of the sinus straight, the angle acute, the lobes acute, veins radiating from the center, dichotomously 1-3 forked from the middle or below; peduncles somewhat stouter than the petioles; sepals oblong, 3-3.5 cm. long, green on the back, petals white, veined with purple, mostly oblanceolate, somewhat shorter than the sepals; stamens about 20, the anthers about half the length of the filaments, subulate; pistil urceolate, the disc concave and umbonate, 7-lobed, the lobes recurved; fruit not seen. → (Castalia Leibergii Morong; Nymphaea Leibergii Morc

which was moved,

In a small pond "just east" (now west) of Granite Sta., along the N.P.R.R., Leiberg; ~~probably~~ possibly indtroduced from Asia by Chinese laborers on the Northern Pacific R.R. who were camped at this point. The plants, we believe, have long since disappeared; at any rate, none were found.

3. Nymphozanthus L. C. Richard. Pond Lily.

Perennial aquatics with creeping rootstocks. Leaves floating, sometimes emersed or elevated above the surface, deeply cordate, on long petioles. Sepals 5-12, concave, green or yellowish and petal-like. Petals several to many, linear-oblong, stamenlike, hypogynous. Stamens numerous, hypogynous, imbricated around the ovary, recurving at maturity. Ovary 10-25-chambered, the stigmas disc-like, radiating. Pod ovoid, rather fleshy. Seeds not surrounded by a membranous aril.

1. N. polysepalus (Engelm.) Fern. Wokas. Rootstock stout, 8-10 cm. in diameter, flattened, fleshy, the leaf scars prominent; leaves tufted at the apex of the rootstock, the petioles of variable length, 30-150 cm. or more, 2-3 cm. in diameter, blades floating or emersed, 20-40 cm. long or more, ovate or oval, deeply cordate at the base, the lobes rounded or very obtuse, both surfaces smooth, the secondary veins parallel, dichotomously 3-4 times forked near the margin; flowers on peduncles equal to the petioles, floating or emersed; sepals petaloid, orbicular, 3-5 cm. in diameter, the outer green, the inner yellow or reddish-yellow; petals 15-20, more or less hidden beneath the recurved stamens; anthers reddish-purple; pistil urceolate, the disc yellow, the radiating lines simple, 12-20; fruit an urceolate fleshy pod 4-5 cm. long, the disc flaring; seeds smooth, oval, 4-5 mm. long, (Nymphaea polysepala Greene; Nuphar polysepalus Engelm.).

Frequent throughout our range below 3000 feet in ponds and lakes or swampy river margins, in 1-4 feet of water and muddy bottom. The plants may appear terrestrial late in summer due to drying of pools.

Ceratophyllaceae. Hornwort Family.

Submerged aquatic herbs with jointed stems. Leaves in whorls, 2-3 times dichotomously dissected into linear segments. Flowers monoecious, axillary, inconspicuous. Perianth wanting, its place supplied by a cleft persistent involucre. Stamens numerous, the filaments very short or wanting. Pistil 1; ovary 1-~~celled~~ chambered. Fruit a nutlike achene.

Ceratophyllum L. Hornwort.

Characters of the family.

1. C. demersum L. Stems filiform, branching freely; leaves 6-9 in each whorl, 1.5-2 cm. long, twice or thrice equally forked, the divisions linear, roughened by minute spines on the margin; involucral segments 1.5 mm. long, green; achenes oval, somewhat flattened, 5-6 mm. long, borne on short stalks about 1 mm. long, bearing 3 needle-like tapering appendages, 4-6 mm. long, one at the apex, two at the base, strongly reflexed.

Frequent in shallow water along lake shores.

Berberidaceae. Barberry Family.

Shrubs or herbs. Leaves alternate, simple or compound and often spiny. Flowers perfect, regular. Sepals 6 in two whorls, petal-like. Petals 6 in two whorls, each with two glands at the base. Stamens as many as and opposite the petals; anthers opening by two uplifted flap-like valves. Ovary 1, superior, 1-chambered. Fruit a capsule or berry.

Mahonia Nutt. Oregon Grape.

Evergreen shrubs or undershrubs with yellow wood. Leaves alternate, compound, spinescent, leathery. Flowers yellow, in racemes which are fascicled in the axils of stiffish bracts. Sepals petal-like, subtended by 3 smaller bractlets. Petals bifid at the apex. Stigma peltate. Fruit a berry.

o Leaflets commonly 11-17; flower clusters apical,
  4 sheathed by a series of prominent rigid bracts
  4 2-3 cm. long — 1. M. nervosa

o Leaflets 3-9; flower clusters axillary or apical;
  4 bracts 5-6 mm. long, not prominent

    2 Erect, branching shrubs; leaflets 7-9, usually
      6 glossy on the upper surface — 2. M. aquifoliu

    2 Low, reclining undershrub, little or not at all
      6 branched; leaves tufted, leaflets 5-7, commonly
      6 5, dull green — 3. M. repens

1. M. nervosa (Pursh) Nutt. Low shrubs 30-40 cm. tall, from a short scaly caudex, commonly 4-6 cm. long, the scales 2-3 cm. long, stiff, reddish; leaves tufted, on petioles 5-8 cm. long, blades commonly 11-17 foliolate; leaflets sessile, ovate to oblong, acute, rounded at the base and very oblique, the margins sinuately spinose, the spines slender, leaning strongly forward, the upper surface green but hardly glossy, the lower ~~surface~~ paler and dull, the reticulations not at all prominent, absent beneath; flowers yellow, in racemes 8-12 cm. long, sheathed at the base by ~~the~~ a prominent tuft of scales; bracts ovate-lanceolate, thin, 5-6 cm. long, persistent; inner sepals 6-7 mm. long, obovate; the petals subequal, bifid at the summit; stamens included, filaments entire; fruit subglobose, 8-9 mm. in diameter, deep blue with a white bloom; seeds 4.5-5 mm. long, oval, flattened, dark mahogany color. (Berberis nervosa Pursh; Odostemon nervosus Rydb.).

Infrequent, occurring on dry hillsides in Yellow Pine-Douglas Fir type.

2. M. aquifolium (Pursh) Nutt. → Erect, evergreen bushy shrub, 30-60 cm. tall; leaves pinnately 7- or 9-foliolate, the blades 15-20 cm. long, clasping at the base; leaflets sessile, 4-6 cm. long, elliptic-oblong, subacute at the apex, obliquely rounded at the base, sometimes subcordate, the margins simuately spinose, the spines slender, leaning forward, upper surface glossy, dark green, the lower paler and dull, the reticulations evident on both; flowers yellow, crowded in racemes 3-8 cm. long, these fascicled in the axils; bracts broadly ovate, 1-2 mm. long, persistent; pedicels slender, 4-6 mm. long or more; innermost sepals about 5 mm. long, obovate; petals 6-7 mm. long, ovate-oblong, stamens 3.5-4 mm. long, filaments with a pair of recurved teeth near the apex; fruit subglobose, about 8 mm. in diameter, deep blue with a white bloom; seeds oval, 3.5 mm. long, smooth and glossy, rich mahogany color. (Odostemon nutkanus Rydb., Berberis aquifolium Pursh). → (~~Berberis aquifolium Pursh~~ nutkanus Rydb.)

Occasional in rocky open places at lower elevations; never the typical plant of the Pacific Coast and frequently difficult to distinguish from M. repens.

not → Lake Coeur d'Alene, Epling and Houck 10003; Moyie Springs, Epling 10430; Upper Priest Lake, Epling 7028; Upper Priest R., 3000 ft., Epling 7547.

3. M. repens (Lindl.) G. Don. → Dwarf evergreen shrub, rarely more than 30 cm. tall, the stem decumbent or reclining, frequently several dcm. long, dark ~~fuscous~~ and roughened; leaves commonly 2-4, crowded near the apex of the stem or branches, pinnately 3-7 (usually 5) foliolate, clasping at the base; leaflets sessile, commonly 5-7 cm. long, elliptic-oblong, subacute at the apex, obliquely rounded at the base, sometimes subcordate, the margins sinuately spinose, the spines slender, upper surface mostly dull and rather pale green, the lower paler and dull or glaucous; flowers yellow, in racemes 4-8 cm. long; bracts broadly ovate, 1-3 mm. long, persistent; innermost sepals 5-7 mm. long, obovate, the petals subequal, ovate-oblong, bifid at the apex; stamens 2.5-3 mm. long, included, filaments with a pair of recurved teeth near the apex; fruit oval, or obovate, 7-8 mm. long, deep blue, with a white bloom; seeds 4 mm. long, oblong-elliptic and curving, glossy and deep mahogany color. (Berberis repens Lindl.; Odostemon Aquifolium Rydb.).

Common in drier slopes and in burns. The early leaves are frequently simple, ovate or 3-lobed.

Aristolochiaceae. Birthwort Family.

Low herbs or twining shrubs, frequently aromatic. Leaves alternate or basal, commonly broad, entire, cordate or kidney-shaped, without stipules. Flowers solitary or clustered, perfect. Perianth petaloid, commonly 3 or 6 lobed, regular or irregular. Stamens 6-12, united with the style. Ovary inferior, at least in part, 6-chambered, placentae parietal. Fruit a 6-chambered capsule.

Asarum L. Wild Ginger.

Acaulescent herbs, the leaves terminal on slender, branching, creeping rootstocks; flowers solitary, epigeous and inconspicuous; perianth brownish, 3-lobed; stamens 12. Fruit a rather fleshy capsule.

1. A. caudatum Lindl. Wild Ginger. Rootstocks 20-25 cm. long, branching, slender, fragrant with the odor and taste of ginger; leaves several, in pairs, persisting for two years, the petioles 10-15 cm. long, sparsely villous, the blades cordate to reniform, the lobes rounded, the sinus 2-3 cm. deep, both surfaces sparingly pubescent, the margins ciliate; flowers solitary, borne in the axils of the paired leaves, the peduncle 3-4 cm. long, villous; perianth segments oblong, 2-2.5 cm. long, each bearing two white areolae within the cup, spreading in the upper half and purple, acuminate into a tail 4-5 cm. long, which is reddish and pubescent; anthers 2.5 mm. long, recurved-appressed, purple, the tip of the connective very short; styles united, the column 4-5 mm. tall.

Common throughout our range in shaded, moist woods, 2500-5000 feet. According to Geyer, the Indians used the stems as a spice, boiling them with other food; the tails of the petals are infolded in bud.

Betulaceae. Birch Family.

Trees, or less commonly shrubs, with bark which separates into two layers and alternate leaves with scarious deciduous stipules. Flowers of two sexes in separate catkins, both borne on the same tree, appearing in early spring, with or before the leaves. Perianth present or none. Staminate flowers 1-3 in the axil of each bract, stamens usually several or numerous, anthers 2-chambered, dehiscing longitudinally. Pistils 3 in each bract, ovary 2-chambered, style branches 2. Fruit a 1-chambered, 1-seeded nut or nutlet.

thin

o Fruit a conelike catkin, the scales of which are shaped like a fleur-de-lis and fall from the central axis in late summer — 1. Betula

o Fruit a small cone with persistent woody wedge-shaped scales — 2. Alnus

1. Betula L. Birch.

Trees or shrubs with smooth bark conspicuously marked with transverse lenticels, in some species separating into very thin papery sheets. Perianth present in staminate flowers, 2-4 lobed, wanting in the pistillate. Stamens 2, the filaments branched, each bearing a single anther. Ovaries sessile. Nutlets small, compressed, winged, bearing the persistent stigmas, falling with the bracts, leaving the persistent rachis.

o Leaves commonly 5-8 cm. long, acuminate, rounded to truncate or cordate at the base; cones usually 3-4 cm. long or more — 1. B. papyrifera

o Leaves commonly 2-4 cm. long, mostly obtuse or obscurely acuminate, or else blunt and rounded, mostly cuneate at base; cones usually 2-2.5 cm. long

2 Leaves ovate, obtuse or obscurely acuminate, serrate — 2. B. fontinalis

2 Leaves obovate, obtuse or rounded at the apex, mostly crenate — 3. B. pumila

1. B. papyrifera Marsh. var. occidentalis (Hook.) Sargt. Paper Birch.
A slender graceful tree rarely reaching a diameter of 60 cm.; bark bronze (chiefly in saplings but occasionally in maturer forms) to chalky-white, peeling, readily disclosing a moss-green or orange colored inner bark beneath; branches slender, chestnut-

brown; branchlets olivaceous, somewhat hairy, glandular, the dwarf branchlets 2-5 cm. long, commonly bearing 2-3 leaves; leaves 5-8 cm. long, (more in shade forms) broadly ovate, acuminate, rounded at the base, or cordate, irregularly doubly or singly serrate, glabrous and rather dull above, sparingly pubescent beneath, strongly so on the veins toward the base, petioles 1-2 cm. long, puberulent; staminate catkins pendulous, 5-8 cm. long; mature pistillate catkins 2-5 cm. long, cylindrical or tapering at one or both ends, on peduncles 5-10 mm. long, the subtending leaf frequently reduced and toothed, the bracts 5 mm. long, ciliate on the margins and more or less puberulent, suggesting a fleur-de-lis in outline, the lateral lobes ascending; nutlet oval, 1.5 mm. long, puberulent, the membranous wing on each side, sometimes nearly twice as wide, deeply obcordate. ——→(B. occidentalis Hook).

Typically developed principally in the valley floor north of Lake Pend Oreille, occurring in burns and open places.

——→var. subcordata (Rydb.) Sargt. Similar in foliage and habit to var. occidentalis, the bark tending to mahogany color, often resembling that of a cherry tree, smooth and shining, peeling and separating into layers with more difficulty; range of variation in fruit about the same as in var. occidentalis. The leaves are often thicker and more regular and are frequently lightly cordate at the base. Numerous individuals occur which may be referred equally well to either variety. ——→(B. subcordata Rydb.).

Occurring principally in the southern part of our region in the warmer valleys.

——→var. montanensis (Butler) Sargt. ——→A stockier more widely branching tree when mature than var. occidentalis, the saplings suggesting Alnus at a distance. The mature bark is decidedly gray and much tougher than in var. occidentalis, such that it may be cut only with difficulty with a sharp knife, the blade glancing off. The lenticels are prominent, their margins elevated. The bark separates into layers only with difficulty. In foliage and fruit characters there appears to be the same range of variation as in var. occidentalis. In the valley of the St. Joe River, where this form is abundant, it appears sufficiently distinct to warrant specific segregation. ——→(B. montanensis Butler).

2. B. fontinalis Sargt. Spring Birch. A small graceful tree, 5-6 m. tall, or shrubby, forming open clumps or frequently thickets; bark bronze or chestnut color to clay color, marked by conspicuous horizontal lenticels, peeling and separating into thin layers but not readily; branchlets drooping, finely hairy and warty with numerous glands; leaves 2.5-4 cm. long, broadly ovate or subrotund, obtuse or acute at the apex, rounded, subtruncate or broadly cuneate at the base, rather sharply toothed, the teeth triangular, 1-2 mm. long, both surfaces resinous and villous when unfolding, becoming glabrous, or nearly so, dull green above, paler and yellowish-green below, minutely glandular dotted, petioles glandular dotted, about 1 cm. long, slender; staminate catkins pendulous, 4-6 cm. long, the bracts resinous, hairy, abruptly acuminate at very tip, mature pistillate catkins 1.5-2 cm. long, cylindrical, on peduncles 2-3 mm. long, bracts ciliate on the margin and puberulous, 3.5 mm. long; nutlet oval, the wings obcordate, the notch shallow or wanting, each wing about equal in width to the nutlet. → (B. microphylla Bunge).

Occasional in the open broader valleys below 3000 feet.

3. B. pumila L. var. glandulifera Regel. Clump Birch. A clump type of shrub 2-3 m. tall, stems numerous, ascending; bark dark chestnut-brown at the base, peeling only with difficulty, branchlets puberulent and glandular-warty, ascending; leaves commonly 1.5-4 cm. long, those on suckers frequently longer, thickish and leathery, obovate or oval, very obtuse or rounded, commonly cuneate at the base, the upper surface dark green and shining, the lower paler and dotted with glands, the veins minutely reticulate, margins crenately toothed, the teeth blunt and rounded, petiole 3-6 mm. long; mature pistillate catkins 1.5-2 cm. long, cylindrical, on glandular peduncles 5-6 mm. long, bracts ciliate on the margins, the lobes blunt, subequal; nutlet oval, 1.5 mm. long, the wings not cordate at the apex, each one scarcely the width of the nutlet.

Sphagnum bogs at elevations of 2500-4000 feet or more; infrequent but abundant locally. →

not → Priest Lake, Piper 3739; Upper Priest Lake, Erling 7745; near Oxford Ranger Station 4000 ft., Epling and Houck 9681; Lamb Cr. 3000 ft., Epling and Houck 10232.

Bracts ("cone-scales")

Alnus L. Alder.

Trees and shrubs. Perianth wanting in the pistillate flowers, 4-parted in the staminate. Staminate flowers commonly 3 in the axil of each bract; stamens 4, persistent, cuneiform, equally 4-lobed at the apex, the under surface provided with a fifth subequal appendage. Nutlet winged.

o Leaves and twigs and budscales glabrous and somewhat 4 sticky — 1. A. sinuata

o Leaves, twigs and budscales pubescent

2 Leaves prevailingly double toothed; mature 6 "cones" 12-14 mm. long, on peduncles mostly 4-5 mm. long — 2. A. tenuifolia

2 Leaves prevailingly single toothed, the teeth usually less than 1 mm. tall; mature 6 "cones" 8-10 mm. long, on peduncles mostly 5-8 mm. long — 3. A. rhombifolia

1. A. sinuata (Regel) Rydb. Shrubby, rarely an erect tree with us, commonly in clumps, the stems partly reclining on the ground, 2-4 m. tall, 10-20 cm. in diameter; young bark smooth, olivaceous, older bark grey, lenticels scattered, prominent, brownish, ovate, vertical, 2-4 mm. long; bud scales glabrous, resinous; branchlets resinous, shining; leaves 5-15 cm. long, rather broadly ovate, obtuse or somewhat acute, obliquely rounded at the base, sharply serrate, less often sinuately doubly serrate, upper surface glabrous, polished, lower surface sub-resinous, glandular, at least in the younger leaves, veins hairy in the angles; petioles 1-2 cm. long, glabrous; stipules oblong-lanceolate, recurved and soon deciduous, resinous; staminate catkins 10-12 cm. long, rhachis puberulent, calyx lobes rounded, shorter than the stamens; pistillate catkins commonly 6-8 in a terminal cluster, oval when mature, 10-15 mm. long, the scales subentire, peduncles slender, glandular, commonly 1-1.5 cm. long, 1 mm. in diameter; nutlets oblanceolate in outline, 2-2.5 mm. long, each wing as wide or wider. (A. sitchensis Sargt.).

Throughout our range, frequent in young burns, persisting however only in stream bottoms or on springy subalpine slopes, here forming ~~communities.~~ tangles sometimes several acres in extent; abundant from 3000-6000 feet.

2. A. tenuifolia Nutt. ——→ A small tree in our range, less often forming clumps, 8-12 m. tall, (D.B.H. 10-20 cm.) mature bark fissured, dark grey, younger bark steely grey with a lustre, lenticels often but not always transverse, becoming corky and broken into vertical fragments in older bark, fairly mature bark longitudinally striate within when peeled, quickly becoming a rich tobacco brown, staining the fingers; branchlets olivaceous, pubescent; bud scales puberulent, not resinous; leaves 5-10 cm. long, oval, mostly obtuse, subtruncate at the base, at least in some, both surfaces dull, the lower pubescent on the veins, margin distinctly double toothed, the larger teeth blunt, the smaller usually so, petioles 1-1.5 cm. long, puberulent, stipules elliptical, 1-1.5 cm. long, ~~calyx lobes~~ twisted-curling, soon deciduous; staminate catkins 5-6 cm. long, calyx lobes rounded, shorter than the stamens; pistillate catkins commonly 6-8 in terminal clusters, ovate when mature, 12-14 mm. long; scale lobes .8-1 mm. long; peduncles stout, commonly 4-5 mm. long, 1.5 mm. thick, glandular; nutlets elliptical in outline, 2.5 mm. long, each wing scarcely equal to or less than their diameter.

Throughout our range but largely confined to alluvial soil of stream bottoms, usually below 3000 feet.

3. A. rhombifolia Nutt. ——→ A well developed tree with trunks 10-15 m. tall and D.B.H. of 20-30 cm., the bark dull, soft gray, little or not at all fissured, longitudinally striate within when peeled, quickly changing color to a rich cinnamon brown, staining the fingers, the branchlets gray, pubescent; bud scales pubescent; leaves prevailingly 6-12 cm. long 3.5-7 cm. wide, prevailingly oval or ovate, rounded or very obtuse at both ends, very thin and soft, with a flaccid drooping habit on the tree, pubescent on both surfaces, the upper sometimes glabrate, the margins finely and irregularly toothed, the teeth scarcely 1 mm. tall, infrequently somewhat double toothed; petioles 1-1.5 cm. long, pubescent; stipules 5-6 mm. long, oblong-lanceolate, pubescent; staminate catkins not seen; pistillate catkins commonly 4-5 in terminal clusters, narrowly ovoid, 10-12 mm. long, borne on rather stout peduncles 5-8 mm. long, 1 mm. thick; seeds not seen.

Little Bear and Potlatch

Locally numerous in canyons tributary to the Clearwater River; not observed within our region proper, but may occur in the broader valleys.

Corylaceae. Hazelnut Family.

Trees or shrubs with simple alternate leaves. Staminate flowers without perianths, borne in pendulous catkins, each flower consisting of 4 stamens, seemingly 8, each anther and filament representing half of a forked stamen, these borne upon small scales which conceal them before elongation of the ament. Pistillate flowers borne in inconspicuous clusters, only the red stigmas emerging from the scales by which they are covered, each scale bearing 2 flowers, each flower being subtended by 2 minute fringed bractlets, the perianth very rudimentary. Fruit a globose nut which at maturity is housed within a ~~beaked~~ sac like foliaceous involucre formed from the scales.

Corylus (Tourn.) L. Hazelnut.

Characters of the family. Shrubs with smooth bark not separating into layers, flowering in early spring before the leaves appear.

1. C. rostrata Ait. var. californica A. DC. California Hazelnut.
A shrub 1-2.5 m. tall, with numerous ascending stems; bark smooth, grey with a dull lustre, the branchlets olivaceous or brown, hirsute when young, becoming glabrous, leaves 6-8 cm. long, obovate-oval, abruptly acuminate at the apex, narrowed and rounded and commonly lightly cordate at the base, the margin sharply serrate, the teeth 1-2 mm. tall, both surfaces hirsute, the upper becoming glabrate, petioles 1.5-2 cm. long, hirsute; staminate catkins 6-8 cm. long, the bracts hirsute, acuminate, anthers with a tuft of hairs at the apex; nut 12-15 mm. in diameter, globose, the involucre produced into a beak which is subequal to the nutlet or longer, ribbed, hairy at the base.

Broad, well drained flats in the valley floor, Kootenai River.

4664

Urticaceae. Nettle family.

Herbs with commonly brittle or fragile stems, alternate or opposite leaves; stipules commonly present. Flowers inconspicuous, green, dioecious, monoecious, or polygamous. Perianth of ~~2-5~~ 4 more or less distinct segments. Stamens as many as the perianth segments and opposite them, the filaments inflexed before anthesis. Ovary superior, 1-chambered. Fruit a small achene.

0 Leaves opposite; plants with stinging hairs — 1. Urtica

0 Leaves alternate; plants without stinging hairs — 2. Parietaria

Urtica L. Nettle.

Erect, commonly tall and stinging herbs with opposite leaves. Flowers greenish in catkin-like spikes or racemes which are clustered in the axils of the leaves, appearing whorled. Staminate flowers with a 4-lobed calyx; stamen 4, spreading. Pistillate flowers with a 4-lobed calyx in two very unequal pairs, the inner larger, enclosing the achene; achene elliptic-lenticular.

1 Lobes essentially glabrous, but armed with occasional stinging hairs, the leaves somewhat pubescent on the veins beneath;

4 stems mostly less than 1.5 m. tall

2 Annuals; stems 30-40 cm. tall; leaves commonly 3-4 cm. long — 1. U. urens

2 Perennials; stems 50-100 cm. tall or more; leaves commonly 8-12 cm. long

4 Leaves tending to cordate at the base, acute rather than acuminate, the stipules narrowly oblong, less than 1 cm. long, tending to be blunt — 2. U. Lyallii

4 Leaves prevailingly rounded at the base, acute
2 (rather than acuminate, the stipules 1-1.5
(cm. long, tending to lanceolate and acute 3. U. gracilis

0 Plants pubescent, the leaves softly hairy; stems mostly
4 1.5-3 m. tall 4. U. holosericea

1. U. urens L. Annual, stems erect, branching from the base, 20-50 cm. tall, glabrate but with a sparse covering of stinging hairs, quadrate, channelled, angles obtuse; leaves commonly 3-4 cm. long, elliptical to ovate, obtuse, broadly cuneate at the base, the margin very coarsely toothed, the teeth conical in outline, bending forward, acute, 3-4 mm. tall, 3-4 mm. ide at the base, both surfaces glabrate, with a few stinging hairs, lower surface paler, petioles half the length of the blades; flowers mixed in the same spike, these commonly simple, spreading, 2 cm. long; staminate sepals 1 m. long, ovate; inner pistillate similar, the outer much smaller; achene ovate, 1.5 mm. long.

An occasional weed around dwellings, naturalized from Europe. Observed at Coolin.

2. U. Lyallii Wats. Stems erect, unbranched or branching from the base, 1-2 m. tall, glabrous or rather sparingly strigose, never pubescent, quadrate, channelled, the angles very obtuse; leaves commonly 8-12 cm. long, ovate to lanceolate, rounded and more or less narrowly cordate at the base, acuminate, the apex drawn out into a tail 1-2 cm. long, 5-6 mm. wide at the base, margin coarsely toothed, the teeth generally ovate, curving forward, the inner side of the tooth concave, 3-5 mm. tall, 5-8 mm. broad at the base, upper surface dark green, glabrous, the lower more or less pubescent upon the veins and sparingly strigose, petioles 2-5 cm. long, slender, puberulent and sparsely

strigose, stipules narrowly oblong, obtuse, brownish, membranous; flowers sessile in small glomerules, the glomerules forming a simple or branching spike, the pistillate spikes in the upper axils, drooping, commonly 3-4 cm. long, the staminate frequently in the axils beneath the pistillate or the plants dioecious, spreading, both sparingly pubescent, very slender, not strigose; staminate sepals somewhat more than 1 mm. long, ovate, acute, the filaments twice as long; inner pistillate sepals subrotund, the outer half as long or less, much narrower; achene about 1 mm. long, elliptic-ovate, smooth.

Meadows and stream bottoms of the white pine type throughout our range, 2500 to 5500 feet or more.

3. U. gracilis Ait. Stems erect, 1-1.5 m. tall, usually purple, the internodes 8-15 cm. long, sparingly provided with stinging hairs, otherwise glabrate, leaves rather yellowish-green, the lower ovate, 10-12 cm. long, 5-6 cm. broad, sometimes broadly ovate, prevailingly rounded at the base, hardly cordate, or the lowermost cordate, very acute but hardly acuminate, the margins coarsely-toothed, the teeth 5-10 mm. tall, both surfaces glabrous except for stinging hairs along the veins, or shortly pubescent, the median and upper leaves similar but tending to lanceolate, typically rounded at the base; petioles 1-3 cm. long, stout; stipules membranous, oblong-lanceolate, acute, 1-1.5 cm. long; branches of the pistillate inflorescence 25-30 mm. long, hispidulous, hoary, those of the staminate inflorescence 4-6 cm. long; inner sepals of the pistillate flowers scarcely 1 mm. long, nearly 1.5 mm. in fruit, those of the staminate 1.5 mm. long, all hispidulous; stamens 2.5 mm. long, yellow; achenes smooth, slightly more than 1 mm. long.

Occasional at lower elevations in meadows and along roadways; difficult to distinguish from both the preceding and the succeeding species in our area; U. gracilis is here interpreted, in the sense of Fernald, as a northern species barely entering our boundaries. Doubtless U. viridis Rydb. will be found along our southern borders.

4. U. holosericea Nutt. Stems erect, unbranched, 1-3 m. tall, commonly strigose and more or less woolly-pubescent and hispid with stinging hairs, quadrate, channelled; leaves 8-12 cm. long, lanceolate, rounded at the base, the margin coarsely serrate, the teeth triangular, acute, inclined forward, commonly 3-5 mm. tall, 5-7 mm. wide at the base, apex acute, closely pubescent, hoary, uppermost leaves gradually reduced to linear bracts, petioles 2-4 cm. long, strigose and pubescent; stipules oblong, mostly obtuse, membranous, 6-10 x 3-4 mm., hairy; flowers sessile in small glomerules, the glomerules forming a panicle, the pistillate spikes in the upper axils, drooping, commonly 3-4 cm. long, the staminate in the axils beneath the pistillate, spreading, usually longer, both pubescent and more or less strigose; staminate sepals 1 mm. long, ovate, acute, equal, the filaments twice as long; inner pistillate sepals 1 mm. long, subrotund, the outer half as long, much narrower; achene about 1 mm. long, elliptic-ovate, smooth.

Horse Plains, Leiberg 1593; Thatuna Hills, Suksdorf & Houck 9149; Latah Co., Piper 1508. Stipules of topotypes (Monterey, Calif.) are triangular-lanceolate, acuminate. Our region is a transition zone of ~~overlap~~ between the coastal U. holosericea, the leaves of which are ovate, even broadly so, and coarsely serrate, and the interior U. serra Blume (sensu Fernald) the leaves of which are strictly lanceolate, and finely and evenly toothed. Individuals of colonies vary. The sheet of Leiberg 1593 at Rocky Mt. Herb. has the stems not at all tomentulose, but glabrate beneath the spreading bristles. The sheet of same collection and others at Berkeley are as described.

2. Parietaria L. Pellitory.

Cap [redacted] diffusely branched herbs without stinging hairs. Leaves alternate, 3-veined, exstipulate. Flowers polygamous, borne in axillary glomerules, subtended by bracts. Perianth of 4, (sometimes 3) more or less united segments, those of the perfect flowers nearly distinct. Stamens as many as the perianth segments. Stigmas tufted. Achene ovoid, included within the persistent perianth.

1. P. pennsylvanica L. [redacted] Slender annuals, the stems [redacted] pubescent, 15-40 cm. tall; leaves lanceolate, 2-5 cm. long, thin, acuminate or acute at the apex, narrowed at the base, glabrous, the margins entire, petiole shorter than the width of the leaf; bracts linear, 4-5 mm. long, obtuse; perianth segments linear-lanceolate, acute, hirtellous; achene 1 mm. long, [redacted] smooth.→(P. occidentalis Rydb.).

To be expected in the southwestern part of our range.

Salicaceae. Willow Family.

Trees or shrubs with alternate often conspicuously stipulate leaves, ~~and~~ dioecious flowers, produced in early spring, often preceding the leaves, borne in catkins which are shed entire. Proper perianth none, each flower subtended by a scale-like bract, sometimes seated ~~seated~~ upon a cup-shaped glandular disc. Stamens 1-several. Pistil solitary, forming a small capsule at maturity, dehiscing longitudinally. Seeds numerous, comose.

Leaves of mature plants ovate or nearly rotund; buds with several scales, commonly very resinous; scales of catkins fringed — 1. Populus

Leaves oblong to lanceolate; buds with a single scale, not markedly resinous; scales of catkins not fringed — 2. Salix

1. Populus L. Poplar.

Short-lived trees often large with pale or whitish bark becoming furrowed at maturity. Buds resinous, with several scales. Leaves commonly ovate, sometimes varying on the same tree to lanceolate, petiolate. Catkins subtended by a cup-shaped disc. Bracts fringed, sometimes conspicuously peltate. Stamens numerous. Ovary 1, sessile, subglobose or ovoid. Stigma equalling the number of placentae and valves, lobed. Capsule ovoid or lanceolate, 2-4-valved.

0 Petioles laterally flattened, especially near the base
4 of the leaf; leaves green on both surfaces

2 Leaves ovate to rotund, rounded to subcuneate at the
6 base, rarely over 5 cm. long; capsule valves 2 1. P. tremuloides

2 Leaves deltoid-ovate, with a broad shallow sinus at
6 the base, 6-10 cm. long or more; capsule valves 3-4 2. P. Sargentii

0 Petioles columnar or nearly so; leaves silvery or rusty
4 beneath

2 Leaves prevailingly rounded at the base; pods
6 pubescent, the pistillate catkins 6-12 cm.
long; young bark usually silvery grey 3. P. trichocarpa

2 Leaves prevailingly cordate at the base; pods
6 glabrous, the pistillate catkins 10-15 or
even 25 cm. long; young bark usually rusty
or yellowish tinged 4. P. balsamifera

1. P. tremuloides Michx. var. aurea (Tides.) Daniels. Aspen. A slender, graceful tree 8-20 m. tall, the bark white at a distance, chalky on closer scrutiny and covered with a white powder, dark gray and furrowed only at the base in older trees (40-45 cm. in diameter); leaves commonly 3-5 cm. long (the juvenile foliage occasionally 10-12 cm. long) leaves, ovate to nearly orbicular, very blunt or abruptly acuminate, rounded to subcuneate at the base, dull green [illegible], lighter beneath, [illegible] crenately serrate, [illegible], petioles slender, flattened laterally near the base of the leaf, pubescent, 1/2 to 2/3 the length of the blade; catkins 3-6 cm. long, the pistillate increasing to 10 cm. [illegible]; bracts 3-5 lobed, softly hairy; stamens commonly 8-10; ovary glabrous, narrowly conical; style short and thick; stigmas 2, fringed; capsules lanceolate in outline, 6 mm. long, 2-valved.

Frequent in dry burns up to 50 years old or in open patches in mature forest, [illegible], but disappearing rapidly with the growth of the forest. Commonly found in small groves, reaching its greatest development below 5000 feet in the broader valleys in springy places or lake embayments, where it may rarely reach a height of 100 feet and D.B.H. of 22 inches. The leaves dance and glisten in a light wind, marking the tree at a distance and making a characteristic rustling sound. Throughout our region but infrequent above 4000 feet.

2. P. Sargentii Dode. Cottonwood. An erect, straight tree, 20-25 m. tall or more, D.B.H. 60-80 cm., young bark rusty in color, soon checking longitudinally, mature bark gray, fissured, the ridges even, the surface plane, lightly cross-hatched, thus formed into plates 10-12 inches long or more, the furrows anastomosing more or less; leaves 6-12 cm. long or more, broadly deltoid-ovate, attenuate at the apex, the point 1-2 cm. long, broadly sinuate at the base, the lobes rounded, sinuate-crenate, both surfaces green; petioles subequal to or shorter than the blade, strongly flattened in the upper half, often reddish; catkins short-stalked, glabrous, the staminate 5-7 cm. long, the stamens 20 or more, with yellow anthers; pistillate catkins glabrous, 8-10 cm. long; capsules glabrous, oblong-ovoid, 10-12 mm. long, the pedicels 4-5 mm. long.

Alluvial bottoms of the Kootenai R. Bonners Ferry, Epling.

3. P. trichocarpa T. & G. var. hastata Henry. Cottonwood. A straight erect tree 20-25 m. tall or more, young bark smooth, light gray or drab, with lenticels, the older bark darker, lightly fissured and rather scaly, in mature trees (4 ft. D.B.H.) becoming fissured to a depth of 5 cm., the ridges 3-5 cm. apart, clay-colored and flattened on the surface as though with a trowel; leaves exceedingly variable in size and outline, varying from lanceolate, 5-20 cm. long (in juvenile foliage and on suckers), to broadly ovate, 5-15 cm. long (ordinary foliage of mature trees), acuminate, rounded at the base (cuneate in the narrower forms) or sometimes cordate, all very pale or silvery beneath, often rusty, especially along the veins, resinous when young, lightly crenate-serrate, petioles about equal to the blade or shorter, terete, commonly puberulent; staminate catkins stout, 3-5 cm. long, stamens numerous, anthers purple, shorter than the filaments, pistillate catkins 6-12 cm. long, 12-15 cm. in fruit, rachis and globose ovary pubescent; capsules 6-7 mm. long, ovoid, crowded, 1-3 mm., distant.

Common throughout our region chiefly below 3000 ft., rarely above 4000 ft., a common entrant in young burns but quickly shaded out, reaching its greatest development in alluvial soil.

4. P. balsamifera L. Balsam Poplar. Trees with straight rather massive trunks 20-25 m. tall with a D.B.H. of as much as 1 m. or more, the young bark yellow tinged or rusty, with dark lenticels, the mature bark light gray, deeply furrowed, the furrows as much as 3 inches deep on old trees, the trough acute, the ridges planed but somewhat roughened, irregularly anastomosing; leaves commonly 9-12 cm. long, 7-9 cm. broad, broadly ovate, rounded and uniformly cordate at the base, abruptly acuminate at the apex, dark green above, white or sometimes rusty beneath, on petioles about half as long as the blade, terete; staminate catkins 3-5 cm. long, with 50-60 stamens in each flower, the anthers dark red, the pistillate catkins commonl

10-15 cm. long, in fruit to 25 cm., capsules smooth, glabrous, subglobose, 5-8 mm. in diameter, speckled with paler green, mostly 3-4 mm. apart, on pedicels 1-1.5 mm. long.

Common along the margins of slower streams and in the alluvial soil of lake embayments. Branches less uniform and more massive than in P. trichocarpa.

Salix. L.

Shrubs or less often trees with usually oblong or lanceolate short-petioled leaves, prominently stipulate, especially those on vigorous shoots. Flowers dioecious, in compact often conspicuous catkins which appear before ~~precocious~~, with ~~coetaneous~~ or after the foliage ~~coretimus~~, each flower subtended by a small ovate or obovate usually entire bract, and accompanied by 1 or sometimes 2 small glands at the base; calyx and corolla wanting. Stamens 1-10 in each flower, usually 2 or 5, the filaments distinct or sometimes partly united. Pistil one in each flower, glabrous or hairy (sometimes becoming glabrous at maturity); style wanting or conspicuous, entire or bifid at the apex. Fruit a small two-valved capsule. Seeds comose.

9 To study satisfactorily the species of this genus it is usually necessary to associate fully developed flowers with the fully developed foliage. It is profitable to mark trees when in catkin and revisit them in midsummer for mature foliage. Undeveloped foliage is often of a different shape and often more hairy than the mature; at the same time foliage of suckers and vigorous shoots may much exceed the dimensions of the ordinary foliage.

1a. Leaves glabrous on both surfaces; pistils glabrous

2a. Leaves typically glaucous beneath, usually prominently so (see S. lasiolepis and S. scouleriana)

Petioles with a pair of wart-like glands at the base of the blade; stamens commonly 5 — 1. S. lasiandra

Petioles eglandular

Leaves lanceolate, long-acuminate, commonly 6-12 cm. long; stamens commonly 5 — 2. S. amygdaloide

Leaves oblong, ovate or obovate, commonly 4-8 cm. long, acute or obtuse or abruptly acuminate at the apex; stamens 2

Plants essentially of subalpine situations, along streams at higher elevations and in subalpine meadows or sphagnum bogs

Stipules wanting or inconspicuous; catkins 1-2 cm. long; plants of sphagnum bogs — 3. S. pedicellaris

Stipules mostly conspicuous, ovate or kidney-shaped, serrulate; catkins 3-7 cm. long; plants of stream bottoms

Pistillate catkins subsessile; leaves coarsely glandular-serrate — 4. S. pseudomonticol

Pistillate catkins on leafy branchlets 1-3 cm. long, leaves finely glandular-serrate or subentire — 5. S. Barclayi

Plants of lowlands along streams and lake shores

Leaves narrowly oblanceolate or linear-elliptical narrowed and acute toward the base — 6. S. melanopsis

Leaves prevailingly oblong, tapering abruptly above the middle, rounded or subcordate at the base

16 Capsules on pedicels .7-2 mm. long — 7. S. lutea

16 Capsules on pedicels 2-4 mm. long — 8. S. Mackenziana

2 2b. Leaves typically green beneath, sometimes paler

4 Petioles provided with a pair of wart-like glands

8 towards the base of the blade; stamens 5 — 9. S. caudata

4 Petioles eglandular

6 Leaves thin, pure green, these and the branchlets

10 glabrous from the bud

8 Stamens joined 1/3 to 2/3 their length; pedicels

12 of pistillate flowers 2.5-4 mm. long — 10. S. monochroma

8 Stamens free; pedicels of pistillate flowers

12 1-1.5 mm. long — 11. S. pseudomyrsinites

6 Leaves thickish, more or less leathery, dull, these and the

10 twigs wooly, becoming glabrous — 12. S. commutata

1b. Leaves hairy, at least beneath

2 3a. Twigs conspicuously covered with a white bloom; stamens 2

4 Styles wanting or practically so; catkins mostly 1-1.5 cm.

8 long; leaves tending to be silky on both surfaces, the midveins pubescent — 13. S. Geyeriana

4 Styles 1-1.5 mm. long; catkins commonly 2-4 cm. long;

8 leaves green on the upper surface, satiny white beneath, the midveins glabrous

6 Bracts thinly hairy, brown; catkins appearing with

10 the ~~foliage~~ leaves — 14. S. subcaerulea

6 Bracts densely wooly, black; catkins appearing before

10 the leaves — 15. S. bella

3b. Twigs glabrous or pubescent

4 Leaves prevailingly 5-10 mm. wide; styles short or none;

8 capsules hairy

6 Catkins commonly 1-1.5 cm. long; capsules on pedicels

10 2-2.5 mm. long; twigs glabrous; stamens 2 — 13. S. Geyeriana

6 Catkins commonly 2-4 cm. long; capsules subsessile;

10 twigs wooly; stamens 2

8 Leaves (except of suckers or young shoots) pre-

12 vailingly glabrous on the upper surface — 16. S. exigua

8 Leaves silky-silvery on both surfaces — 17. S. argophylla

4 Leaves prevailingly 1-4 cm. wide

6 Petioles usually provided with a pair of wart-like glands

10 at the base of the blade; stamens 5; capsule glabrous — 1. S. lasiandra

6 Petioles eglandular; stamens 2 or 1.

8 Upper surface of leaves green and glabrous, the

12 lower covered with a close satiny pubescence; twigs glabrous; capsules silvery pubescent

10 Styles .7-1.5 mm. long; stamens 2 — 18. S. drummondiana

10 Styles .5-.7 mm. long; stamen 1 — 19. S. sitchensis

8 Upper surface of leaves green and glabrous or

12 pubescent, the lower more or less wooly, not satiny; twigs mostly pubescent (except S. melanopsis)

10 Pistils and capsules glabrous, stamens 2

12 Leaves prevailingly glabrous on the upper

16 surface

14 Branchlets glabrous — 6. S. melanopsis

14 Branchlets mostly pubescent — 20. S. lasiolepis

2 Leaves downy on both surfaces (~~glabrate in var.~~ ~~denudata~~)
16 (glabrate in var. denudata) — 12. S. commutata

10 Pistils and capsules wooly or silvery pubescent

12 Stamen 1; leaves oblong, thickish, glabrous

16 above, dull silver beneath, not satiny — 21. S. Coulteri

12 Stamens 2

/4 Leaves downy on both surfaces

/6 Filaments hairy at the base; leaves

20 commonly 4-6 cm. long — 22. S. Eastwoodiae

/6 Filaments glabrous; leaves commonly

20 2-4 cm. long — 23. S. bebbiana

/4 Leaves glabrous above, commonly 5-12 cm.

/8 long, prevailingly elliptical-oblanceolate — 24. S. scouleriana

1. S. lasiandra Benth. A small slender tree 5-12 m. tall with rough furrowed bark; twigs deep reddish-purple, lustrous; leaves lanceolate, commonly 6-12 cm. long, 1.5-2.5 cm. wide, acuminate to a very sharp point, rounded or narrowed at the base, finely glandular-serrulate, glabrous, dark green and shining above, glaucous beneath; petioles commonly 8-12 mm. long, bearing one or two wart-like glands on the upper surface near the base of the blade; stipules inconspicuous, glandular; staminate catkins 2-6 cm. long, 1-1.3 mm. wide, stamens commonly 5; pistillate catkins 3-10 cm. long, 1.2-2 cm. wide; bracts lanceolate to ovate, usually dentate; capsules pale straw-color or light brown, 5-7 mm. long; pedicels 1.5-2 mm. long.

Lake shores and along streams.

var. lancifolia (Anderss.) Bebb. Young branchlets pubescent; leaves thinly so.—St. Marios, Epling and Wyckoff.

2. S. amygdaloides Anderss. A small tree 5-10 m. tall with cinnamon-colored fissured bark; twigs yellow, smooth; leaves lanceolate, commonly 6-12 cm. long 1.5-3 cm. wide, acuminate to a sharp point, rounded or narrowed at the base, finely serrulate, light green above, glaucous beneath; petioles 5-15 mm. long, without glands; catkins ~~cotaneous~~ appearing with the leaves on leafy branchlets, the staminate yellow, 3-5 cm. long, slender, flexuous, the pistillate loose and elongated, 4-8 cm. long; stamens commonly 5; bracts elliptical, hairy inside, quickly deciduous; capsules glabrous 4-5 mm. long; pedicels slender, 2 mm. long, exceeding the bracts.

To be expected in the southern part of our range along the large streams. Banks of Snake R.

3. S. pedicellaris Pursh. Low shrubs usually about 1 m. tall, glabrous throughout; leaves elliptical to narrowly obovate, 2-4 cm. long, mostly obtuse at both ends, entire, firm in texture, glabrous, green above, glaucous beneath; petioles 2-3 mm. long; stipules wanting or inconspicuous; catkins 1-2 cm. long, plump, borne on short leafy branchlets; stamens 2; bracts obovate, thinly hairy, persistent; capsules glabrous, 5-7 mm. long on slender pedicels 2-3 mm. long.

In sphagnum bogs, usually in subalpine situations.

no 11 → Priest Lake, ~~not~~ Piper 3720.

4. S. pseudomonticola Ball. Shrub 1-3 m. tall with yellowish or brown shining branchlets, usually glabrous; leaves commonly elliptical-ovate or ovate sometimes obovate, 4-8 cm. long, 1.5-3.5 cm. wide, rounded at the base or subcordate, acute or abruptly acuminate at the apex, coarsely glandular-serrate, glabrous and strongly veined on both surfaces, green above, glaucous beneath; stipules conspicuous, ovate or kidney-shaped, serrulate; petioles commonly 6-12 mm. long; catkins appearing with the leaves, subsessile, the pistillate 3-7 cm. long, the staminate shorter; bracts obovate, obtuse, brown, densely woolly; stamens 2, with glabrous filaments; capsules glabrous, 6-8 mm. long on pedicels 1-1.5 mm. long.

Along streams at higher elevations. ——————→

——→ Indian Grave Camp, 6000 ft., Kirkwood 2006; Fish Lake Cr., 5000 ft., Kirkwood 1879.

5. S. Barclayi Anderss. Shrub 1-4 m. tall with thinly hairy or glabrous brown or blackish rather stout branchlets; leaves oval or obovate, 5-10 cm. long, 1.5-3.5 cm. broad, mostly wider above the middle, obtuse or short acuminate at the apex, mostly narrowed at the base, subentire or finely glandular-serrulate, mostly glabrous above when fully developed, glaucous beneath; stipules usually conspicuous, ovate, serrulate; petioles 6-10 mm. long, stout; catkins on short leafy branches, the staminate 1-3 cm. long, plump, the pistillate commonly 4-6 cm. long, 1.5 cm. wide; stamens 2; bracts dark, elliptical, hairy; capsules glabrous 6-8 mm. long on pedicels about 1 mm. long; styles 1-1.5 mm. long.

In subalpine meadows. ——————————→

not → Fish Lake, 6000 ft., Epling and Houck 9618, 9619; Oxford R. S., 5000 ft., Epling and Houck 9667.

6. S. melanopsis Nutt. Dark green shrub or small tree 3-5 m. tall, the twigs glabrous and dark brown; leaves narrowly oblanceolate or linear-elliptical, acute at both ends commonly 4-8 cm. long, 6-15 mm. wide, finely denticulate, less often subentire, dark green and glabrous above, pale and glaucous beneath; stipules evident, more or less deltoid, toothed; petioles indefinite nearly wanting; catkins 3-4 cm. long, obtuse, glabrous or thinly hairy; capsule glabrous, 4-5 mm. long, sessile or nearly so.

Along streams at lower elevations. Upper Priest R. 3000 ft.; Wallace.

var. B Bolanderiana (Rowlee) Schn. Leaves more or less pubescent beneath. With the species, even more prevalent.

7. S. lutea Nutt. Usually dense shrubs 2-5 m. tall with glabrous yellow branchlets; leaves yellowish-green, oblong or oblong-elliptical, 4-8 cm. long, 1-2.5 cm. wide, tapering rather abruptly above the middle to a sharp point, rounded or even subcordate at the base, finely and evenly serrulate, glabrous, paler or glaucous beneath; petioles slender, 5-8 mm. long, stipules conspicuous, mostly kidney-shaped and clasping, serrulate or entire; catkins nearly sessile on very short leafy twigs, the staminate 2-3 cm. long, the pistillate 2-4 cm. long, 1 cm. wide; stamens 2; bracts obovate tawny, downy; capsules plump, glabrous, 4-5 mm. long, on pedicels 1-2 mm. long. (S. cordata Piper).

Along streams at lower elevations. Thatuna Hills, Epling & Houck 9194.

~~b.~~ 8. S. ~~M~~ackenziana (Hook.) Barr~~e~~tt. (a) Shrub or small tree with usually elongate yellowish or brownish glabrous branches, leaves ~~oblong~~ oblong, commonly 6-12 cm. long, 2-3.5 cm. wide, tapering rather abruptly above the middle to a sharp point, rounded or even cordate at the base, finely glandular-serrulate ~~margin~~, glabrous above, glaucous beneath; petioles commonly 8-12 mm. long; stipules conspicuous, usually kidney-shaped and clasping; catkins ~~appearing with~~ ~~the leaves~~, ~~obtaneous~~ the leaves, borne on very short leafy branchlets, the staminate 2-3.5 cm. long, pistillate rather lax, commonly 4-6 cm. long; stamens 2 with glabrous filaments; bracts obovate, thinly pubescent on the outside, densely so within; pedicels 2.5-4 mm. long; capsules glabrous, 4.5-5.5 mm. long, the style about .5 mm. long.

Common along streams and lake shores and in swampy places.

~~St. Maries, Epling and Wrokoff; Epling and Offord 8607; Upper Priest Lake, Epling and Simcoe 7166; Viola, Epling; Pierce, Epling; Moscow Mts., Epling~~

9. S. caudata (Nutt.) Heller. Shrubs 2-5 m. tall, rarely a small tree; branchlets usually elongate, shining, chestnut brown; leaves oblong-lanceolate or lanceolate, commonly 6-12 cm. long, 1.5-2.5 cm. wide, long-acuminate to a sharp point, rounded or narrowed at the base, green and [redacted] glabr never glaucous beneath, finely glandular-serrulate [redacted]; petioles commonly 8-12 mm. long, commonly with a pair of wart-like glands at the base of the blade; stipules inconspicuous or wanting; staminate catkins 2-4 cm. long, 1-1.2 cm. wide, stamens commonly 5; pistillate catkins 2-5.5 cm. long, 1.5 cm. wide; bracts ovate or obovate, glabrate on the outer surface; capsule straw-color 5-7 mm. long, pedicels 1-1.5 mm. long; styles .5-.7 mm. long.

Lake shores, along streams and in wet meadows.

not ⟶ var. parvifolia Ball. Leaves 4-8 cm. long, 6-12 mm. wide.

not ⟶ — Bovill, ~~Epling;~~ St. Maries, ~~Epling and Wyckoff~~; Thatuna Hills, ~~Epling and Houck 9201~~.

10. S. monochroma Ball. Shrub 1-3 m. tall with glabrous shining light brown branches; leaves oblong-lanceolate or narrowly ovate, 3.5-7 cm. long, 1.5-3 cm. wide, abruptly or gradually acuminate, rounded at the base, glandular-serrulate, thin, green and glabrous and similarly colored on both surfaces; petioles slender commonly 5-12 mm. long; stipules conspicuous, ovate or kidney-shaped; catkins appearing with the leaves, the staminate slender and flexuous, 4-6 cm. long, 8-10 mm. wide, the pistillate 3-6 cm. long, 1.2-1.8 mm. wide; stamens 2, their filaments glabrous, usually united to above the middle; ~~bracts~~ capsules glabrous, 4-7 mm. long on pedicels 2.5-4 mm. long; styles .3-.7 mm. long.

Along streams. ——————————————————→

NOA ——→ Thatuna Hills, Epling and Houck 9160. Type from "valley of Hatwai Creek Nez Perce Co."

11. S. pseudomyrsinites Anderss. Shrub 1-3 m. tall with leafy brown shining twigs; leaves [redacted] elliptical or oblong-elliptical 3-6 cm. long, 1-2 cm. wide, acute or acuminate at the apex, narrowed or rounded at the base, shallowly glandular-serrulate or nearly entire, green on both surfaces, the lower coarsely reticulate; stipules lanceolate to ovate; petioles commonly [redacted] 5-8 mm. long; catkins [redacted] appearing with the leaves, borne on very short leafy branchlets, 2-3 cm. long in both sexes; bracts elliptical or obovate, thinly hairy; stamens 2, with glabrous free filaments; capsules 4-5 mm. long, glabrous, on usually pubescent pedicels 1-1.5 mm. long.

Along streams at higher elevations. ——————————→

1104 ——→ Scurvy Mt., 5800 ft., Kirkwood 1962.

12. → S. commutata Bebb. Shrub 1-3 m. tall with thinly hairy brown or black stoutish branchlets; leaves elliptical, oblong, ovate or obovate, 4-8 cm. long, 1.5-3 cm. broad, usually abruptly narrowed at the apex and acute, some obtuse, usually narrowed toward the base, sometimes rounded, entire or nearly softly hairy on both surfaces, velvety when young, becoming more or less gla in age (var. denudata Bebb.) both surfaces similar in color; stipules eviden ovate; petioles commonly 8-12 mm. long; catkins appearing with the foliage, 2-5 cm. long, borne on short leafy branchlets; stamens 2, with glabrous filam bracts dark, obovate, wooly; capsules 5-7 mm. long, glabrous on pubescent pe about 1 mm. long; style 1-1.5 mm. long.

In subalpine meadows and along streams at high elevations. →

with → Fish Lake, 6000 ft., ~~Epling and Houck 9613~~; Oxford R. S. 5000 ft. ~~Epling and Houck 9678~~; Hughes Fork Meadow, 3000 ft., ~~Epling 7391~~; Monroe Cr ~~Kirkwood 1990~~

13. S. Geyeriana Anderss. Low leafy shrub .5-1 m. tall, much branched with slender glabrous blackish twigs which may be more or less glaucous; leaves narrowly elliptical or elliptical-oblanceolate, commonly 4-6 cm. long, 5-10 mm. wide, acute or acuminate at the apex, narrowed, or less often, rounded at the base, entire, green above, paler and more or less silvery beneath, particularly when young; stipules none; petioles commonly 3-8 mm. long; catkins on very short leafy branchlets, the staminate scarcely 1 cm. long, ovoid, the pistillate 1-1.5 cm. long, numerous; bracts elliptical-oblong, thinly hairy, the tips reddish; stamens 2; capsules 5-7 mm. long, puberulent, on pedicels 2-2.5 mm. long.

Along streams and lake shores at lower elevations.

var. argentea (Bebb.) Schn. Twigs more or less pubescent, the leaves, especially the younger, silvery. —With the species.

14. S. subcaerulea Piper. Shrub 1-3 m. tall with glabrous conspicuously white-glaucous branchlets; buds glaucous; leaves narrowly oblong or oblong-elliptical, rarely oblanceolate, 3-8 cm. long, .5-2.5 cm. broad, mostly acute at both ends, or rounded at the base on suckers, subentire, green and glabrous above, with a close satiny silvery pubescence beneath, the midveins beneath being glabrous and yellow; petioles 5-10 mm. long; stipules usually none; catkins appearing with the leaves, sessile or nearly so, compact, 1-4 cm. long; stamens 2, their filaments glabrous, free; bracts ovate or obovate, thinly hairy, brown; capsules subsessile, silvery, 3.5-5 mm. long; style 1-1.5 mm. long.

Along streams or lakes mostly at higher elevations.

15. S. bella Piper. Shrub 1-4 m. tall with brownish mature bark and glabrous conspicuously white-glaucous branchlets sometimes yellowish; buds glaucous; leaves oblong or oblong-lanceolate, 6-12 cm. long, 1.5-3 cm. broad, acute or obtuse at the apex, obtuse or rounded at the base, subentire, green and glabrous above or nearly so, with a close satiny silvery pubescence beneath, the midveins beneath yellow and glabrous; petioles commonly 5-12 mm. long; stipules usually evident but small, mostly ovate, acute; catkins appearing before the leaves, ~~precocious~~, sessile or nearly so, compact, the staminate 2-3 cm. long, the pistillate 2-6 cm. long; stamens 2, their filaments free, glabrous; bracts ovate or obovate, black, densely woolly; capsules subsessile, silvery, 4.5-5.5 mm. long; style 1-1.5 mm. long.

Along streams and lake shores at lower elevations.

16. S. exigua Nutt. Ash-colored shrub 2-4 m. tall or a small tree with dark furrowed bark; twigs glabrous, very slender; leaves linear or linear-oblanceolate, 3-8 cm. long, 4-7 mm. wide, acute at both ends subsessile, thin, sparingly denticulate or nearly entire, glabrate and green above (rarely silky), silky-pubescent beneath with appressed hairs (leaves of young shoots may be silky and silvery on both surfaces); stipules none or inconspicuous, catkins terminating short leafy branchlets, 1-3 together, the staminate 2-4 cm. long, the pistillate 3-6 cm. long; stamens 2; bracts elliptical, acute, more or less hairy; capsules 4-6 mm. long, glabrous or thinly hairy.

Along streams. Bonners Ferry, Epling 10467; Sandpoint, Epling 10404; Viola, Epling.

17. S. argophylla Nutt. Shrub 2-4 m. tall, the young twigs white-woolly; leaves linear to linear-oblanceolate, 4-8 cm. long, 5-10 mm. wide, tapering and acute at both ends, nearly entire, silky and shining white on both surfaces

petioles indefinite, 3-5 mm. long; stipules inconspicuous or wanting; catkins ~~serotinus~~ appearing after the leaves, terminating leafy shoots, 1-3 together, 2-4 cm. long, slender; bracts elliptical, acute, hairy; stamens 2; capsules woolly, 5-6 mm. long, nearly sessile.

Along streams at lower elevations. Viola, Epling.

18. S. drummondiana Barratt. Shrub 1-3 m. tall with reddish brown or sometimes yellowish puberulent branchlets and buds; leaves oblong-elliptical or obovate, 3-6 cm. long, 1-2.5 cm. wide, obtuse or abruptly acuminate at the apex, narrowed but usually obtuse at the base, subentire, green and glabrate above or puberulent, with a close satiny silvery pubescence beneath, and midvein yellowish but pubescent; petioles commonly 5-10 mm. long, rather slender, puberulent; stipules inconspicuous; catkins sessile or nearly so, appearing before the leaves, ~~precocious~~, 1-3 cm. long; stamens 2, their filaments glabrous, free; capsules silvery, 5 mm. long.

Along streams at median elevations. White Sand Cr., (Selway For.) 3600 ft., Kirkwood 2037.

19. S. sitchensis Sanson. Shrub 2-7 m. tall with brownish mature bark and slender dark brown or black branchlets, the youngest frequently short-downy; leaves obovate and widest above the middle, 4-8 cm. long, 1.5-3.5 cm. wide, obtuse or abruptly acuminate at the apex, narrowed below the middle but commonly obtuse at the very base, subentire, dull green and glabrous or somewhat downy above, with a close satiny silvery pubescence beneath (rarely glabrate and green); petioles commonly 5-12 mm. long, usually pubescent; stipules inconspicuous; catkins ~~cootaneous~~, appearing with the leaves, usually on short branchlets, dense, slender, the staminate 2-3 cm. long, the pistillate 4-8 cm. long, very silky when young; bracts obovate, brown, thinly hairy; stamen 1, its filament glabrous, capsules silky 4-6 mm. long.

Along streams in swampy places and along lake shores, common at lower elevations.

20. S. lasiolepis Benth. Shrub or small tree 2-8 m. tall with usually pubescent dark brown branches, leaves oblong or oblong-oblanceolate commonly 6-10 cm. long, 1-2 cm. wide commonly glabrous above, pubescent or sometimes glabrate or even glaucous beneath, subentire, mostly obtuse at the apex, narrowed to petioles 8-12 mm. long; catkins appearing before the leaves, precocious, subsessile, 3-7 cm. long; stamens 2, their filaments united at the base; bracts obovate, dark brown, densely hairy; capsule 4-5.5 mm. long, glabrous, on pedicels .5-1 mm. long; style .5 mm. long.

Along streams.

21. S. Coulteri Anderss. Shrub 2-4 m. tall with stout brown usually woolly or downy branchlets; leaves prevailingly oblong; sometimes obovate, 5-10 cm. long, 2-3.5 cm. wide, obtuse or abruptly acuminate at the apex, usually obtuse or rounded at the base, coarse and somewhat leathery, subentire but more or less crenate-undulate, green and glabrous or somewhat downy above, with a soft dull velvety pubescence beneath, the midvein yellow and pubesce stipules mostly evident, kidney-shaped; petioles commonly 5-10 mm. long; catkins ~~ecotaneous~~ appearing with the leaves, usually on short branchlets, the staminate 3-5 cm. long, the pistillate slender, 5-10 cm. long; bracts obovate, brownish, densely woolly; stamen 1, its filament glabrous; capsules silvery, 4-4.5 mm. long, subsessile.

Common along streams at lower elevations.

22. S. Eastwoodiae Ckll. Low shrub .5-2 m. tall with dark brown, usually woolly branchlets; leaves elliptical or elliptical-lanceolate, frequently elliptical-obovate, 4-6 cm. long, 1-2 cm. wide, acute at the apex, obtuse or rounded at the base, subentire, softly woolly on both surfaces; petioles rather stout, commonly 8-10 mm. long; stipules inconspicuous; catkins ~~ecotaneous~~ appearing with the leaves on short leafy branchlets, the staminate 1-3 cm. long, plump, the pistillate 2-5 cm. long; bracts brownish, tomentose; stamens 2, their filaments hairy at the base; capsules downy 5-6.5 mm. long.

Along streams at higher elevations. Fish Cr. (Mont.) 4500 ft., Epling & Kempf.

23. S. bebbiana Sargt. Much-branched shrub or small tree 2-5 m. tall with short brown or olive twigs which are pubescent to glabrous, their internodes relatively short, the leaves thus usually crowded; leaves elliptical or oval, rarely obovate, mostly 2-4 cm. long, 1.5-3 cm. wide, acute at the apex or abruptly short-acuminate at the very end, narrowed or rounded at the base, mostly entire, dull green above and somewhat downy, softly ashy-pubescent beneath, the veins reticulate; stipules inconspicuous; petioles commonly 3-6 mm. long; catkins ~~ecotaneous~~ appearing with the leaves but rather late, the pistillate commonly persistent into the summer; staminate catkins 1-2 cm. long, plump; pistillate catkins on short leafy branchlets 3-6 cm. long, 1-2 cm. wide; bracts oblong-elliptical, acute yellowish; stamens 2, their filaments very slender; capsules woolly, 6-10 mm. long, on slender pedicels 2-5 mm. long. (S. perrostrata Rydb.).

Common along streams and along lakes in swampy places at lower elevations.

24. S. scouleriana Barratt. Shrub or small slender tree 2-12 m. tall with dull gray smoothish bark and brown branchlets, usually lightly downy; D.B.H. as much as 20-25 cm.; leaves variable but prevailingly elliptical-oblanceolate, usually somewhat wider above the middle, commonly 5-12 cm. long, 2-4 cm. wide (larger in shade forms); obtuse or abruptly acuminate at the apex, narrowed toward the base and usually wedge-shaped but often rounded, subentire but often crenate-undulate or even crisped, green and glabrous above, with a soft dull velvety pubescence beneath, the midvein yellowish and pubescent (rarely glabrous and glaucous beneath); petioles commonly 5-12 mm. long; stipules usually conspicuous, kidney-shaped or earlike; catkins ~~precocious~~ appearing before the leaves, sessile or on short branchlets, the staminate plump, 1.5-3 cm. long, the pistillate 2-5 cm. long, compact; scales obovate, black, hairy; stamens 2, their filaments glabrous; capsules woolly, 7-9 mm. long.

Common throughout our region, abundant on dry hillsides in burns where it forms an important factor in early succession.

Rosaceae. Rose Family.

Herbs, shrubs or trees with alternate usually stipulate entire or compound leaves. Flowers regular, mostly perfect, solitary, in racemes, corymbs or umbels. Calyx 4, 8, or 5-parted, the sepals frequently alternating with an equal number of sepal-like appendages, the calyx-tube varying from saucer-shaped or flat to urn-shaped and contracted at the throat. Stamens 2, 4, 5, 10 or numerous, commonly seated on the margin of the calyx-tube. Pistils 1-many, wholly superior or partly or wholly inferior. Fruit various, dry or fleshy, dehiscent or indehiscent, a cluster of small pods or achenes, a drupe, or an accessory fruit formed either of a cluster of small drupelets (as in the blackberry), of achenes seated upon a fleshy receptacle (as in the strawberry), or a pome (as in the apple) or of achenes enclosed within an urn-shaped receptacle (as in the rose).

~~There is valid agreement for recognition of these families here, representing three unlike fruit types mutually exclusive group to group, arising from these different flower types~~ to

o Calyx 5-parted, often with 5 additional sepal-
4 like appendages; stamens 5 numerous; petals 5

2 Each flower containing 1 superior pistil with
6 a single style; fruit a cherry (~~or Drupaceae~~) 1. Prunus

2 Each flower containing 1 inferior pistil bearing
6 2-5 styles; fruit a small apple-like pome, (~~or Pomaceae~~)

4 Leaves pinnately compound 2. Sorbus

4 Leaves simple

6 Branches armed with stout thorns; fruit
10 with 1-5 chambers 3. Crataegus

6 Branches unarmed; fruit with 10 chambers 4. Amelanchier

2 Each flower containing 2-5 or numerous pistils;
6 fruit an equivalent number of small pods, achenes or a cluster of drupelets as in the blackberry; (~~or true Rosaceae~~)

4 Shrubs with simple leaves but sometimes lobed leaves

6 Fruit like a raspberry; leaves 10-30 cm. broad 10. Rubus

6 Fruit dry, consisting of 2-5 small pods;
10 leaves less than 10 cm. broad

8 Leaves palmately lobed, subrotund; 5. Physocarpus

8 Leaves pinnately lobed or merely toothed,
12 ovate, oval or oblong, not rotund;

10 Leaves glabrous, or at most thinly hairy
14 on the veins beneath; ovules several in each ovary 6. Spiraea

10 Leaves hairy on both surfaces; ovules
14 2 in each ovary — 7. Holodiscus

8 Leaves twice ternately lobed, the lobes
12 linear; low ~~herbs~~ undershrubs with creeping woody stems — 8. Luetkea

4 Herbs or shrubs with compound leaves (merely twice ternately lobed 8 in Luetkea)

6 Shrubs, the leaves borne alternately along
10 the stems

8 Stems armed with prickles

10 Pistils and achenes contained within a
14 hollow receptacle narrowed at the throat — 9. Rosa

10 Pistils borne on a flat or hemispheric
14 receptacle; fruit a raspberry or blackberry — 10. Rubus

8 Stems unarmed

10 Petals red; fruit a glabrous raspberry — 10. Rubus

10 Petals yellow; achenes hairy — 11. Dasiphora

6 Herbs, the leaves mostly in basal tufts

8 Calyx 5-parted with 5 sepal-like appendages
12 borne between the sepals; fruit composed of several to numerous achenes, either hairy or glabrous, seated on a more or less elevated sometimes juicy hemispheric receptacle

10 Pistils and achenes glabrous; styles deciduous in fruit
14

12 Leaves 3-foliolate

/4 Fruit dry, consisting of 10-15 achenes

on a hemispheric receptacle;

stamens 5 12. Sibbaldia

/4 Fruit fleshy, a strawberry; stamens

/3 20-40 in two rows 19. Fragaria

12 Leaves with 5-10 numerous subdivisions, pinnate

/6 or palmate

/4 Styles attached at the apex of the ovaries,

/3 of equal width throughout

/6 Leaves pinnately compound; stamens 5 or 10.

/3 Stamens 10; petals white 13. Horkelia

/3 Stamens 5; petals yellow 14. Ivesia

/6 Leaves palmately 3-9 foliolate;

20 stamens about 20 in 3 series 15. Potentilla

/4 Styles attached to side or near base of ovaries

/6 Styles ~~south~~ tapering at both ends; stamens 20-30

in a single series on a pentagonal

disc 16. Drymocallis

/6 Styles of equal width throughout

/3 Petals yellow; leaves with smaller

segments, between the larger;

stamens about 20 in 3 series 17. Argentina

/3 Petals purplish red; leaflets subequal; stamens about 20, attached

at the base of the receptacle 18. Comarum

10 Pistils and achenes hairy; styles persistent
14 in fruit or only a portion deciduous

12 Style abruptly twisted above the middle;
16 fruit a globose prickly head — 20. Geum

12 Style not twisted near the middle; fruit
16 a tuft of plumose tailed achenes — 21. Sieversia

8 Calyx 5-parted without appendages; fruit either
12 < 2-7 fleshy drupelets or 4-6 small pods;
creeping or decumbent herblike undershrubs

10 Leaves 5-foliolate the leaflets serrate; fruit
14 2-7 drupelets — 10. Rubus

10 Leaves usually twice ternate, the segments
14 entire; fruit 4-6 pods — 8. Luetkea

0 Calyx 4- or 8- parted; petals 4-merous or wanting.

2 Stamens 2 or 4; petals none; erect leafy herb — 22. Sanguisorba

2 Stamens numerous; petals 8, showy; caespitose mat-
6 plant — 23. Dryas

1. Prunus L. Cherry.

Slender small trees or tree-like shrubs with alternate simple leaves. Flowers in racemes or axillary umbels. Calyx 5-parted, the tube campanulate or turbinate. Petals 5, obovate, white, inserted with the stamens on the margin of the calyx-tube. Stamens numerous. Ovary superior, 1-chambered. Fruit a drupe.

Flowers in racemes 8-10 cm. long, terminating short lateral branches; teeth of the leaf-margins curving forward, pronglike — 1. P. virginiana

Flowers in axillary umbel-like racemes 1-2 cm. long; teeth of leaf-margins closely appressed and appearing to arise from the sinus — 2. P. emarginata

1. P. virginiana L. var. demissa (Nutt[illegible]) Torrey. Western Choke Cherry. A treelike shrub or slender small tree, the stems erect, 4-5 m. tall or more, the branches rather sharply ascending, mature bark grey, roughened by short reddish vertical fissures which give a mottled appearance, the outer bark not separable, the inner bark with a distinct flavor of peach-pits but not at all bitter, branchlets green, becoming mahogany color, glabrous; buds ovate, acute, 4-5 mm. long, glabrous, dull; leaves dark green, the blades 5-15 cm. long, rather leathery, especially in drier situations, elliptical but somewhat broader above the middle, obtuse at the base, shortly acuminate at the apex, upper surface glabrous, the lower much paler, thinly hairy along the veins or glabrous, the margins finely toothed, the teeth shaped like small prongs curving to the apex of the leaf, petioles 1-1.5 cm. long, bearing two glands at the base of the blade but on the petiole, stipules linear, quickly dropping; flowers showy, in racemes 8-10 cm. long or more, terminating short lateral branchlets borne on second year wood; pedicels 4-5 mm. long, calyx-lobes hemispherical, thin, scarcely 1 mm. long; petals white, orbicular, 3.5 mm. in diameter; stamens 3 mm. long; fruit globose-ovate, 7-11 mm. long, 6-8 mm. wide, a very deep cherry-red, pit ovate, rather acute at the apex, but little flattened laterally.

Occasional throughout our region usually below 4000 feet, growing on open ledges in the forest, or open gravelly slides, or at the base of talus slopes, or along roadways at lower elevations.

var. melanocarpa (A. Nels.) Sargt. Similar to and often growing with the typical form but the leaves glabrous beneath and the fruit black, globose, 6-8 mm. in diameter, the pit obtuse at both ends, laterally flattened. →

no ¶ →This variety has a quite characteristic aspect in fruit, the branches often being heavily laden. The pit characters herein mentioned do not appear to be constant. An infusion made from the dried bark of this tree is said to have been used by the natives in treatment of coughs and colds.

and markedly drooping.

2. P. emarginata (Dougl.) Walp. ——→ An intricately branched shrub 1-4 m. tall, or rarely with us, a small slender tree 4-5 m. tall, the branches widely spreading; bark chestnut brown, resembling the bark of the bronze birches, separating readily into two layers, the lenticels transverse, 2-5 mm. long, branchlets usually reddish; leaf-blades 5-9 cm. long, rarely 3 cm. wide, narrowly elliptical or somewhat oblanceolate, obtuse or rounded at the apex, rarely acute, the margins finely toothed, the teeth rounded, bearing a small prong which lies closely appressed and appears to arise between the teeth, both surfaces glabrous; petioles 5-10 mm. long; glands, if present, on the margin of the leaf-blade, near but not on the petiole, appearing sometimes as the lowermost teeth; flowers borne in umbel-like axillary racemes, the rachis 1-2 cm. long, the bractlets minute, toothed, soon falling; pedicels about 1 cm. long; calyx-tube 3 mm. long, obovate, the lobes 1-2 mm. long, rounded; petals white, 3-4 mm. long oval to orbicular, narrowed at the base; stamens and style 4-5 mm. long; fruit bright red, oval, rather acute, 8-9 mm. long, the pit flattened-elliptical, 7 mm. long, with 3 acute ridges along one margin.

Found chiefly either at low elevations, sometimes forming thickets, or at elevations of 5000-6000 feet on open mountain sides on old nearly reclaimed talus slopes. [illegible] Suspected of stock poisoning, particularly in movements along trails.

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var. mollis (Dougl.) Brewer. The branchlets and one or both surfaces of the leaves, the inflorescence and usually, but not always, the calyx and corolla softly hirsute, and more or less glandular; stipules oblong, 6-8 mm. long, tardily deciduous, glandular laciniate; the leaves seem broader in proportion and more oval than in the typical form. Interspersed with the species or at somewhat lower elevations.

2. Sorbus L. Mountain Ash.

Trees or shrubs with alternate pinnate leaves, the stipules deciduous. Flowers perfect, regular, in terminal corymbose cymes. Calyx 5-parted, the sepals deciduous. Petals white, orbicular. Stamens many. Ovary inferior, 3-chambered; styles 3. Fruit a small reddish or orange pome.

Leaves mostly 9-13-foliolate, the leaflets finely serrate throughout, each with about 40 teeth; fruit orange red — 2. S. sitchensis

Leaves mostly 7-9-foliolate, the leaflets serrate, chiefly above the middle, each with 15-20 teeth; fruit rosy on one side like an apple — 1. S. occidentalis

1. S. occidentalis Wats. A diffuse shrub 2-3 m. tall, the stems ascending, often reclining at the base, the bark shining, gray or olivaceous, smooth, the branches marked by roundish scattered lenticels; the branchlets thinly hirsute with usually yellowish hairs, sometimes glabrate; the bud scales similarly hirsute, the buds narrowly ovate, 6-8 mm. long, resinous only at the base, the terminal 12 mm. long; stipules narrowly lanceolate, membranous, green, usually entire, about 1 cm. long, withering but more or less persistent; leaves 15-20 cm.. long, oval in outline, pinnately 7-9-foliolate, (less commonly 5 or 11) the rachis often bright red; leaflets oblong-oval, 4-6 cm. long, obtuse at both ends, only the terminal one sometimes narrowed below the middle, the margins toothed except in the lower third or often only above the middle, the teeth 15-20, curving upwards, acuminate, both surfaces glabrous, the upper dull green, the lower paler, even glaucous; [illegible] terminal, flat-topped, (cym [illegible] 5-8 cm. broad, the pedicels and branches sparsely hirsute, glaucous, reddish; calyx-lobes triangular, 2 mm. long, nearly smooth, persistent on the fruit; the fruit 7-8 mm. long, like a small oval apple, rosy on one side, somewhat glaucous, 3 carpels commonly developing, the seeds about 3 mm. long, obovate.

In more or less open woods usually above 4000 ft., but rarely in subalpine situations.

2. S. sitchensis Roem. → Shrub-like, or less commonly a small tree 2-4 m. tall, stems trailing and reclining when occurring in openings in the woods, ascending in burns and open places, bark olivaceous, shining, marked by a few transverse lenticels, leaf scars rather prominent on younger branchlets, which are thinly glabrous; buds resinous throughout, the inner scales somewhat hirsute, about 1 cm. long; stipules, at least on vigorous shoots, foliaceous and lacerate like a coxcomb; leaves 9-11-foliolate, in whorl-like clusters at the ends of branches, 1.5-2 dcm. long, oval or ovate in outline; leaflets oblong, 4-6 cm. long, usually 4-4.5 times longer than broad, acute at both ends, the margins finely toothed nearly to the base, the teeth 40 or more, acute, both surfaces glabrous, the lower paler, scarcely glaucous; cymes ~~flowers numerous in terminal, flat topped clusters~~ → 10-12 cm. broad, the branches and pedicels thinly hirsute; calyx-lobes triangular, 1 mm. long, hairy within, obscure in fruit, the petals white, rotund, 3-4 mm. in diameter, reflexed, the hypanthium broadly obconic, hairy, especially at the base, stamens 3 mm. long; fruit sparsely hairy, at least at first, 6-8 mm. in diameter, globose, flattened, bright yellow, then orange-red, not glaucous, four carpels commonly developing, 2 seeds in each carpel, 3 mm. long.

Throughout our range at all but the highest elevations, being especially abundant in burns and on subalpine talus slopes which have been sodded by Xerophyllum tenax. In small openings or seepage spots in the higher forests it frequently forms dense tangles, similar somewhat to the alder tangles. At lower elevations in moist places and in creek bottoms, the leaflets are broader and thinner and more coarsely toothed, and the branches are more or less reclining at the base. In openings and at higher elevations the habit is more erect, the shrub is more dense and the leaflets become correspondingly thicker and narrower with ~~a finer toothings~~ teeth. This variability in form has served as a basis for the proposal of several species which apparently represent only ecological forms.

dentition

3. Crataegus L. Hawthorn.

Small trees or tree-like shrubs armed with stout thorns, bearing alternate simple leaves. Flowers in terminal corymbose cymes. Calyx 5-parted, the tube campanulate; sepals 5, soon reflexed. Petals white, rotund, 5. Stamens 10-20. Ovary largely inferior, 2-5-chambered; styles 2-5, distinct. Fruit a small pome, reddish or black, containing 1-5 bony 1-seeded carpels.

1. C. Douglasii Lindl. → A shrub or small tree 3-6 m. tall, 8-15 cm. in diameter, the trunk more commonly straggling, the crown more or less rounded in specimens growing in the open, straggling in shade forms; bark very shaggy, breaking away in flakes, sordid grey or olivaceous, the newly exposed surface cinnamon brown, the young bark smoothish, the branchlets mahogany brown, shining, , the second year growth and older wood armed with stout rigid axillary spines 1-3 cm. long, straight or slightly curved, usually sharp; leaves variable, the blades 2-4 cm. long and usually obovate in sun forms, 5-7 cm. long and obovate-elliptical in shade forms, as much as 12 cm. on suckers, narrowed at the base, even wedge-shaped, the apex rounded or shortly acuminate, the upper surfaces dark green and glossy, the lower surface paler, glabrous or thinly shaggy, especially on the veins, the margin irregularly toothed, usually double-toothed above the middle or towards the apex, the teeth sharp, the petioles .5-1 cm. long, stipules linear, quickly dropping; cymes on short lateral branchlets, ; calyx-lobes irregular, 1.5-2 mm. long, woolly on the inner surface; petals 4 mm. long; stamens 2-3 mm. long, unequal; styles joined half their length; globose, 10-12 mm. in diameter, glabrous, red, then black, the persistent calyx-lobes prominent, carpels 3,

Occasional throughout our range, occurring most frequently around the margins of grassy or swampy meadows, less often in alluvial stream bottoms or on gravelly lake shores, more often in the open than in the shade.

4. Amelanchier Medic. Service Berry.

Small trees or tree-like shrubs with alternate simple leaves. Flowers in short racemes, rather showy. Calyx 5-parted, the tube campanulate; sepals soon reflexed, persistent. Petals white, 5, oblanceolate. Stamens many, the filaments subulate. Ovary inferior, the locules becoming twice as many as the styles; styles 2-5. Fruit a small purple-black pome.

1. A. florida Lindl. A shrub 2-5 m. tall; mature bark dull grey, younger bark olivaceous, somewhat roughened by lenticels and numerous small fissures, branchlets glabrous and glaucous or more or less silky-hirsute, but quickly becoming glabrous and glaucous; buds ovate, reddish, the outer scales glabrous and glaucous, the inner fringed or more or less silky-hirsute; leaves rather dull green, often glaucous, becoming thickish in age, variable on the same plant, commonly 3-4 cm. long, generally oval, varying to oblong-oval or subrotund, rounded or truncate at both ends, commonly lightly cordate at the base, the margins toothed only above the middle, frequently subentire or some leaves wholly so, the dentition teeth now coarse, now fine, the lower surface usually hirsute when young, soon glabrate, or glabrous from the bud, petioles 1-2 cm. long, slender, the stipules linear, red silky, dropping very quickly; racemes on usually short lateral branchlets, the pedicels 1-1.5 cm. long, slender, glabrous or silky at first and becoming glabrous; calyx-lobes 3-4 mm. long, triangular-lanceolate, commonly acuminate, about equal to the tube, glabrous without, more or less woolly within along the margins; petals 10-20 mm. long; stamens about 20, the alternate ones shorter, seated on the margin of the shallow hypanthium which is densely woolly just at the base of the styles; pome depressed-globose, with a bloom, rarely 1 cm. in diameter, one or two seeds only usually maturing.

Common throughout our region, the fruit much prized; a twiggy form growing on basalt ledges above Kenyons is known as A. Cusickii Fernald.

. Physocarpus Maxim. Ninebark.

Shrubs with alternate simple leaves and brown shedding or flaking bark. Stipules deciduous. Pubescence branched. Flowers in terminal corymbs crowd terminating short side branches. Calyx campanulate, the tube hemispherical; sepals persistent, enclosing the fruit. Petals white, spreading. Stamens 20-50 or more, perigynous. Pistils 2-5, more or less united; styles filiform, stigmas capitate; ~~the~~ carpels bladdery at maturity. Seeds 2-4, pyriform, smooth and shining.

◊ Carpels 2-3, strongly flattened, 5 mm. long, densely pubescent:

4 with branched hairs; sepals obtuse; style 2 mm. long 1. P. pauciflorus

◊ Carpels 3-5, somewhat turgid, 7-9 mm. long, nearly or quite

4 { glabrous and shining; sepals subacute; styles 3-4 mm. long 2. P. capitatus

1. P. pauciflorus (Torr.) Piper Shrub 1-3 m. tall; stems ascending, young growth brown, sparingly pubescent with branched hairs, becoming glabrous; leaves broadly ovate or subrotund, 4-6 cm. long, 3-5-lobed, the lowermost lobes obscure or wanting, the middle largest, lightly rounded-cordate or truncate, the margin crenate-serrate, the lobes mostly blunt or rounded, both surfaces or one pubescent, the lower pale; petioles 1-2 cm. long; bracts 3-4 mm. long, spatulate, caducous; pedicels slender, 1-2 cm. long, densely pubescent; calyx campanulate, the lobes rotund, ovate to ovate-obtuse, densely pubescent on both surfaces, 3-4 mm. long; petals white, suborbicular, 4-6 mm. long, the cup yellow, then orange; stamens about 25, somewhat shorter than the petals, the filaments slender; fruiting carpels 2 (or 3), densely pubescent, 5 mm. long, transversely flattened, joined at least to the middle, surpassed and enclosed by the persistent somewhat enlarged calyx; seeds 2 in each carpel, [illegible] mm. long, [illegible]-color. (Spiraea pauciflora Nutt.; P. malvaceus [illegible].

[illegible] throughout our region, 2000-5000 feet, particularly on sunny slopes [illegible].

2. P. capitatus (Pursh) Kuntze. ——→Shrub 1-3 m. or more tall, stems ascending, young growth brown, sparingly ~~stellate~~-pubescent, becoming glabrous, ~~the bark soon shredding and falling away in strips~~, old bark papery and very flaky; leaves broadly ovate, 3-4 cm. long, 3-5-lobed, the lowermost lobes obscure or wanting, the middle largest, lightly rounded-cordate at the base, the margin serrate, the lobes mostly acute, one or both surfaces ~~stellate~~-pubescent, or glabrous the lower pale, petioles about 1 cm. long, glabrous; ~~flowers in crowded corymbs terminating short side branches~~, bracts 3-4 mm. long, oblanceolate, caducous, pedicels slender, 1-2.5 cm. long, densely ~~stellate~~-pubescent; calyx-lobes ovate, acute, 3-4 mm. long, densely ~~stellate~~-pubescent on both surfaces; petals white, orbicular or obovate, scarcely 4 mm. long; the stamens somewhat shorter than the petals, filaments slender; anthers purple; fruiting carpels 2-5, obovate, glabrate and shining, sometimes thinly ~~stellate~~, laterally flattened, but somewhat turgid, 7-9 mm. long, the styles 3-4 mm. long; seeds 2 in each carpel, straw-color, 2.5 mm. long. ——→(Opulaster capitatus Kuntze.).

Occasional in the broader valleys and at the edge of the grassland, growing along small streams and roadways, where it apparently forms hybrids with P. pauciflorus (Epling and Putnam 10133, 10270.) ~~3~~ O. cordatus Rydb.

which represent (?)

pubescent

6. Spiraea L. Meadow-Sweet.

Shrubs with alternate, simple leaves. Stipules none. Flowers in terminal corymbs or panicles. Calyx campanulate, the tube hemispherical or obconical; sepals persistent. Petals 5, white or rose-color, spreading. Stamens numerous, perigynous. Pistils 5, distinct; styles filiform; stigma capitate or discoid. Fruit a cluster of small, leathery follicles; seeds several in each.

Flowers in a flat-topped corymb

Flowers rose-colored; a branching shrub 50-150 cm. tall — 1. S. densiflora

Flowers white; stems commonly unbranched or branched near the base, 30-50 cm. tall — 2. S. corymbosa

Flowers in a narrow, dense panicle, more or less pyramidal — 3. S. Menziesii

1. S. densiflora Nutt. Shrub 1-1.5 m. tall, the branches ascending; second year bark reddish-brown, smooth and shining, soon flaking away, mature bark dull brown with a purplish tinge, smooth; leaf-blades 2-6 cm. long on the same plant, mostly oval or oval-oblong, rounded at both ends or somewhat narrowed at the base, dull green above, paler beneath, margin once or twice serrate above the middle, petioles 2-3 cm. long; flowers rose-purple, ~~in dense terminal~~ corymbs 2-6 cm. broad, bractlets linear; sepals 1.5 mm. long, equal to the tube, ovate or triangular-ovate, obtuse or acute; petals obovate-rotund, about 2 mm. long, very shortly clawed; stamens erect and spreading, 5-6 mm. long; follicles about 4 mm. long, brown and shining.

Occurs at elevations of 5000-6500 feet or more in the eastern part of our region, in subalpine meadows and bogs, on moist slopes and along streams.

2. S. corymbosa Raf. → A low shrub 30-50 cm. tall, the stems frequently solitary and unbranched, or branching near the ground; old bark [illegible], flaking away, bark on new growth a rich brown or purplish, shining, checking when older; leaves 3-6 cm. long, oval to obovate, even subrotund, glabrous, toothed above the middle, the teeth salient, acute, narrowed below the middle to a petiole 3-6 mm. long; flowers numerous, ~~in terminal flat-topped corymbs,~~ → white, bractlets few, subulate, the pedicels slender; calyx 1.5 mm. long, the lobes triangular, reflexed, half the length of the cup-shaped tube; petals 1.5 mm. long, rotund; stamens tinged with pink, 4-5 mm. long; follicles 5, 3 mm. long, the persistent style half again as long. → (S. lucida Dougl.).

Common throughout our region, 2000-6000 feet, found especially in burns and on open slopes in thin soil, where it frequently is the dominant plant over small areas.

S. pyramidata Greene, a hybrid between S. corymbosa and S. Menziesii, is more or less intermediate, 30-200 cm. tall, the inflorescence pyramidal, 5-25 cm. long, flesh-color or white. Frequent in territory occupied by both parent species.

S. roscata Rydb., a supposed hybrid betw. S. densiflora and S. Menziesii, may occur, but the parent species are rarely, if ever, associated in our region.

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3. S. Menziesii Hook. Dense shrub, 1-2 m. tall, the stems numerous, ascending or erect, young growth often dark red or tan, puberulent, soon checking, the thin outer bark flaking away, the inner becoming brownish drab, roughened by mimute longitudinal fissures; leaves oblong, 4-8 cm. long, 1-2.5 cm. broad, obtuse or rounded at the apex, narrowed somewhat at the base, subsessile or on petioles 2-3 mm. long, serrate above the middle, both surfaces glabrous, the lower paler, or sometimes thinly pubescent along the veins; ~~flowers in a~~ (dense, lanceolate or oblong panicle, the secondary branches and pedicels finely tomentose; calyx campanulate, the triangular-ovate lobes soon reflexed, 1.5 mm. long, finely tomentose, equal to the tube; petals ~~roseate~~ rosea, oval, about 3 mm. long, exceeded by the persistent stamens; carpels commonly 5, puberulent; follicles 2.5 mm. long, shining, tipped by the persistent styles; seeds about 1.8 mm. long. ⟶(S. Menziesii Hook; S. idahoensis A. Nels.).

In the yellow pine type and at the margin of the Thuja type, below 3000 feet, in meadows and along streams and the margins of bogs.

7. Holodiscus Maxim. . Cream Bush.

Shrubs with alternate, simple leaves and smooth bark. Stipules none. Flowers numerous in a terminal ~~ciliate and~~ showy pyramidal panicle. Calyx saucer-shaped, the tube nearly flat, bearing a disc within; sepals persistent, erect in fruit. Petals whitish, spreading, short-clawed. Stamens about 20, borne on the disc. Pistils 5, distinct, styles filiform, stigmas 2-lobed. Fruit of commonly indehiscent follicles.

1. H. discolor (Pursh) Maxim. A shrub .5-3 m. tall or higher, commonly about 2 m.; branches erect or ascending, usually numerous; mature bark grey with a purplish tinge, roughened by numerous lenticels, dull; leaves light green, 3-6 cm. long, ovate, subcuneate or more rarely subtruncate at the base, obtuse, coarsely toothed, the teeth commonly again toothed, the teeth cuspidate, upper surface sparingly pubescent, the lower appressed-hirsute, frequently silky, paler, petioles .5-1.5 cm. long; panicles 1-2 dcm. long, almost as broad, branches numerous, softly pubescent; sepals and petals valvate in bud; sepals ovate, pubescent, 1.5 mm. long; petals oval, about 2 mm. long, exceeded by the numerous stamens which are seated on a yellow disc; ovaries pilose; pedicels 3-4 mm. long, each tribracteate below the calyx; carpels 2.5 mm. long, subequal to the calyx and more or less enclosed by it. (Sericotheca discolor Aydb.).

Common throughout our region on dry hillsides, on rock outcrops and in burns, 2000-4000 feet. A form with very laciniate leaves was observed on Oscow Mt.

8. Luetkea Bong. Partridge Foot.

Colonial perennial herb-like undershrubs with creeping woody stems. Leaves tufted, twice-(or thrice) ternately-parted into linear lobes. Flowers in short racemes which terminate the erect flowering stems, all perfect. Calyx 5-parted without appendages, the tube hemispherical. Petals 5, white. Stamens about 20, seated on the margin of the tube. Pistils mostly 5, glabrous forming 2-valved pods at maturity.

1. L. pectinata (Pursh) Kuntze Plants 8-15 cm. tall, tufted or mat-forming, bearing at the apex of stems a tuft of leaves from which arises the flowering stem; leaves 10-15 m.. long, narrowed below the middle to a petiole 1-1.5 mm. broad, the lobes all entire, glabrous; flowering stems 8-10 mm. tall, bearing a few alternate leaves, thinly pubescent; bracts subfoliar; pedicels 1-2 mm. long; sepals oblong-ovate, obtuse, 2.5 mm. long; petals ovate, 2.5 mm. long.

Moist subalpine slope below melting snow banks, Five Lakes Butte, Epling & Kemtf.

9. Rosa (Tourn.) L. The Roses

Erect shrubs the stems usually armed with straight or curving prickles. Leaves alternate, odd-pinnate, the stipules prominent, more or less adnate to the petiole, the leaflets singly or doubly serrate. Flowers showy, perfect, solitary or in few-flowered corymbs. Calyx-tube forming an urn-shaped globose or ellipsoid receptacle, narrowed at the throat, containing the achenes, becoming highly colored and somewhat fleshy at maturity (the hip). Sepals 5, prominent, persistent or deciduous in fruit. Petals 5. Stamens numerous, seated with the petals on the rim of the calyx-tube. Pistils several or many, enclosed within the calyx-tube, each forming an achene at maturity.

o Corolla 2.5-4 cm. across; sepals deciduous in fruit;
4 achenes glabrous

1. R. gymnocarpa

o Corolla 4-8 cm. across; sepals not deciduous;
4 achenes silky

2 Stems with paired prickles at the base of most
6 or many of the leaves

1 Sepals 1.5-4 cm. long; fruit 1.5-2 cm.
8 in diameter; flowers never more than 3
in each corymb

2. R. nutkana

1 Sepals .6-1.5 cm. long; fruit 8-12 mm. in
8 diameter; flowers sometimes solitary,
usually several in each corymb

3. R. ultramontana

2 Stems without paired prickles, but covered with
6 fine straight and scattered bristles

4. R. acicularis

1. R. gymnocarpa Nutt. ——→ A graceful, erect shrub commonly 1 m. tall, diffuse, [redacted] the stems green, the older smooth, marked by brownish longitudinal checks, the younger armed with numerous, straight, slender, spreading prickles, reddish, becoming straw-colored, the branchlets glaucous [redacted]; [redacted] leaves 1-1.5 dcm. long, oblong or oblanceolate in outline, the stipules 1-1.5 cm. long, oblong, acuminate at the apex, the free tip 2 mm. long, the margin glandular-ciliate, the rachis slender, bearing stalked glands and a few short prickles, leaflets 5-9, [redacted] 1.5-3 cm. long, .8-2 cm. wide, the lowermost leaflets often 1/2 the size of the terminal, commonly elliptical or oval, obtuse, rarely acute at both ends, glabrous, dull green above, pale beneath, the margins finely and usually doubly toothed, the teeth sharp, [redacted] about 1 mm. tall; flowers few but showy, borne on short lateral branchlets, the pedicels 1-2 cm. long, glaucous, [redacted]; calyx-lobes lanceolate-acuminate, 5-6 mm. long, glabrous on the outer surface, short-woolly within, dropping from the fruit as it approaches maturity; petals broadly obovate, pale rose color, about 1.5 cm. long, variable; fruit oval, less frequently subrotund, rounded at the apex or narrowed to a short neck, 7-9 mm. long, green and glaucous, then bright orange-red, nearly glabrous within, bearing 4-16 ovate, glabrous achenes 5 mm. long, 3 mm. wide. (R. leucopsis Greene.).

Throughout our range mostly in shaded woods, 2500-4000 feet.

2. R. mutkana Presl. ——→A shrub commonly armed, about 1 m. tall, the stems bearing straight usually numerous prickles, the branches unarmed or bearing one or two stout prickles at the base of each leaf, these sometimes recurved or straight on the same plant, the branchlets mostly glabrous; stipules joined for 1.5-2 cm., 2-3 mm. wide, the free portion 3-4 mm. long, the margins usually bearing stalked glands, 8-10 cm. long, the rachis thinly hirsute or glabrous, usually bearing stalked glands, leaflets 5-7, mostly elliptical and acute at both ends frequently obovate, 2-3 cm. long, more often hirsute along the veins beneath and glandular, the margins toothed, the teeth again usually minutely toothed; flowers 1-3 in corymbs terminating short lateral branches, the bracts stipular, the peduncles 2-5 cm. long, glabrous or bearing stalked glands; calyx-lobes 1.5-4 cm. long, triangular-lanceolate at the base, narrowed at the middle and expanded again towards the tip, usually bearing stalk ed glands and glabrous or woolly, the calyx-tube commonly glabrous and glaucous, sometimes bearing stalked glands and spines; petals rose-color, 2-3 cm. long; fruit subglobose, 1.5-2.5 cm. in diameter, green and often rosy on one face, then orange-red, the calyx-lobes spreading; achenes hirsute, about 3 mm. long, numerous.

Throughout our range in the lower valleys, along streams in alluvial soil, along roadways, sometimes in burns, rarely as high as 5000 ft.,

The above description includes the following forms which have been accorded specific distinction; due to intergradation their recognition in the field is difficult:

0 Calyx-tubes and fruit bearing prickles 1-5 mm. long — R. MacDougali
0 Calyx-tubes and fruit smooth
2 Prickles on stem distinctly recurved, the bases
6 prominent, 1-1.5 cm. long, oblanceolate — R. columbiana
2 Prickles on stem straight or somewhat curving, the
6 bases 2-6 mm. long, elliptical
4 Foliage glandular, the serrations of the leaflets
8 commonly double, tipped with glands — R. mutkana
4 Foliage glandular, the serrations usually simple — R. Spaldingii

3. R. ultramontana (Wats.) Heller. → An erect, much branched shrub 1-2 m. tall, the branches commonly ascending, variably armed with light nearly straight thorns 5-6 mm. long, often slightly deflexed but hardly curving, the base oval, 3-4 mm. long, reddish and glaucous, the branchlets glabrous, [redacted]; leaves 6-12 cm. long, mostly obovate in outline, the stipules 1-2.5 cm. long, the free tip 2-5 mm. long, minutely woolly and glandular [redacted], the rachis woolly and glandular, rarely glabrous, with an occasional short thorn, leaflets 5-9 usually 7, variable in size on the same leaf, 1.5-5 cm. long, 1-2 cm. wide, mostly oval or elliptical somewhat narrower towards the base, rounded at both ends, glabrate on the upper surface, the lower finely woolly, sometimes glandular, the margins finely and simply toothed, the teeth sharp, [redacted] 1-1.5 mm. tall; flowers often numerous, [redacted] in corymbose clusters on vigorous lateral branchlets, the bracts subfoliar, pedicels about 1 cm. long, sepals 6-15 mm. long, usually non-glandular, lanceolate-acuminate, sometimes enlarged towards the tip, thinly woolly, more or less erect in fruit; petals rose-color, 1.5-2 cm. long; fruit subglobose 1 cm. long, 8-9 mm. wide, sometimes narrowed to a short neck, bright orange color or orange-red, silky within, bearing about 20 narrowly ovate, silky-hirsute achenes 4 mm. long, 2 mm. wide.

Throughout our range in stream bottoms and along roadways, mostly in the open, usually below 3000 ft.,

The above description includes the following forms which have been accorded specific distinction; due to intergradation, their recognition in the field is difficult.

0 Fruits distinctly pear-shaped, attenuate above to
4 a distinct neck — R. pyrifera

0 Fruits subglobose, the neck mostly wanting

2 Stems nearly or quite unarmed — R. salictorum

2 Stems distinctly armed

4 Prickles curved; fruits 8-10 mm. in diameter — R. puberulenta

4 Prickles straight; fruits 6-8 mm. in diameter — R. ultramontana

4. R. acicularis Lindl. Prickly Rose. A low bushy shrub 0.5-1 m. tall, the stems and commonly the branches armed with rather weak slender straight and scattered prickles, without stipular or internodal prominent spines; leaves obovate in outline, the stipules broadly ovate, acute, glandular-ciliolate, the leaflets 3-7, oval or oval-lanceolate, obtuse at the apex, rounded at the base, simply or doubly serrate, glabrous above, often resinous-pubescent below, 2-5 cm. long; flowers usually single, 5-8 cm. broad, the calyx-tube pear-shaped, glabrous, the calyx-lobes lanceolate, now acuminate, now spatulate-dilated above, entire or few-toothed, persistent and erect upon the hips; fruit globose or ovoid, sometimes as much as 2.5 cm. long, usually glabrous.

Widely distributed, comprising several races differing in fruit and pubescence characters, but mostly of woods.

10. Rubus L.

Armed or unarmed erect shrubs or prostrate herbs with compound or simple leaves. Stipules present. Flowers racemose, corymbose or solitary, perfect, dioecious or polygamous. Calyx 5-parted, without appendages, the tube saucer-shaped. Petals deciduous, white or rose-color. Stamens numerous, inserted on a disc at the margin of the calyx-tube. Pistils few to many, inserted on a convex or cylindrical receptacle, forming fleshy drupelets at maturity, which may be wholly distinct or may be joined to form a fleshy aggregate fruit which may not separate from the receptacle.

Leaves maple-like, simple, the stems unarmed — 1. R. parviflorus

Leaves 3-5-foliolate

Creeping herb with very slender threadlike, unarmed stems — 2. R. pedatus

Shrubs, sometimes prostrate, more or less armed with prickles

Prostrate; petals white, twice as long as the sepals; fruit a blackberry — 3. R. macropetalus

Erect or the stems drooping, but not prostrate

Petals red, twice the length of the sepals; shrub weakly armed; leaves green and glabrate on both surfaces — 4. R. spectabilis

Petals white, subequal to the sepals; shrubs armed; leaves more or less canescent-tomentose beneath

Prickles straight, weak, hardly expanded at the base; peduncles and calyx with stalked glands — 5. R. idaeus

Prickles curved, stout, expanded at the base; peduncles and calyx without stalked glands — 6. R. leucodermis

1. R. parviflorus Nutt. var. scopulorum (Greene) Fern. Thimbleberry. Erect, spreading, the stems unarmed, slender, 1-2 m. high; branchlets erect, variously hirsute to subglabrous, lightly glandular, the leaves more or less clustered about ends of branchlets; leaves maple-like, thin-textured, long-petioled, palmately 5-lobed, 10-25 cm. wide, the lobes acuminate, doubly serrulate throughout, glabrous or nearly so on both surfaces; flowers 3-7 in an open irregular panicle, the pedicels 1-3.5 cm. long, thinly glandular-hirsute, the glands mixed, some stipitate others subsessile but always slender; sepals ovate, acuminate or cuspidate, soft-villous and glandular-ciliate; petals showy, white, crepe-like, ovate to oblanceolate, about 2 times as long as the sepals; fruit a raspberry, separating from the receptacle, juicy but insipid, low depressed-globose, 1.5-2 cm. wide, the carpels numerous.

Occasional in moist shaded woods, at elevations of 2500-3000 feet. The var. heteradenius Fern. differs in having the subsessile glands of the pedicels and sepals numerous, fuscous, and of irregular length, with the inflorescences tending to be more congested. It apparently occupies the same habitats and at best represents but a form. The var. grandiflorus Farw., reported along our southern borders, differs apparently only in having the stipitate glands subequal and the sepals produced into a prominent tail-like cusp.

2. R. pedatus Sm. delicate A prostrate herb with creeping filiform, stoloniferous stems; leaves on short erect branchlets, stipules 2 mm. long, rotund, petioles 3-4 cm. long, the blades rotund-reniform, 3-6 cm. in diameter, pedately 5-foliolate, the leaflets rhomboid-cuneate, obtuse, acute at the base, doubly incised-serrate above the middle, [redacted] glabrous; flowers solitary or frequently 2, erect, [redacted] axillary in the short lateral branchlets, peduncles longer than the leaves, slender, [redacted]; sepals oblanceolate or narrowly oblong, acute or shortly acuminate, 8-10 cm. long, [redacted] soon reflexed; petals white, 7-8 mm. long, oblanceolate; pistils 1-5, cherry-red at maturity and distinct, 4-5 mm. long, on short stalks; stone 2.5-3 mm. long, nearly smooth.

Seen only in the Priest R. drainage, 2500-5000 feet, in moist, shaded woods, creeping ofer the duff or mossy windfall and stumps.

separate

3. R. macropetalus Dougl. Blackberry. Prostrate, the stems trailing, often forming large mats, armed with slender recurved prickles 2-3 mm. long, green or glaucous; branchlets erect, hirsute and glandular; ~~turions with lightly armed~~ leaves 3-5-foliolate, the blades broadly ovate, 8-10 cm. long, leaflets approximate, distinct, almost sessile, obliquely ovate, or the median pair oval, rounded or lightly cordate at the base, mostly acute or acuminate, thin, hirsute and lightly armed on the veins, the margins irregularly double-serrate the teeth cuspidate, petioles 2-3 cm. long, the rachis somewhat shorter, both hirsute, glandular and lightly armed, the stipules subulate 3-6 mm. long; leaves of the flowering branches 3-foliolate, 3-4 cm. long, the leaflets mostly obtuse; flowers dioecious, 2-3 in each corymb, the pedicels hirsute and glandular with stalked glands and armed with slender prickles; sepals 6-8 mm. long, oblong-ovate, cuspidate, pubescent and glandular and sometimes armed; petals white, elliptical or oblanceolate, 1-2 times as long as the sepals; fruit a blackberry, not separating from the receptacle, cylindrical, 1-3 cm. long, glabrous, the carpels numerous.

Frequent around the upper part of Lake Pend Oreille; edible, of fine flavor.

4.

R. spectabilis Pursh. Salmon Berry. A weakly armed shrub 1-3 m. tall, the bark mahogany color, the branchlets light brown, sparingly silky, becoming glabrous, the prickles 2-3 mm. long, nearly straight, expanded at the base, abundant only on the sterile shoots; leaves trifoliolate, the petioles somewhat shorter than the blades, silky, the stipules about 8 mm. long, filiform, silky, blades 5-6 cm. long at anthesis, double this size at maturity, ovate in outline, the lower remote, the terminal leaflet about twice as large, all broadly ovate, acuminate, rounded at the base or subcuneate, shortly stipitate, the lower oblique, all doubly and sharply serrate, acuminate, sometimes shallowly once or twice lobed, glabrous above, paler and somewhat silky along the veins beneath, the veins rather prominent; outer bud scales, brown, smooth, thickish, the inner silky; flowers solitary on silky pedicels 3-4 cm. long; sepals ovate, 7-8 mm. long, appressed-silky, acuminate; petals about 12 mm. long, bright red, subrotund, narrowed at the base; glabrous, raspberry-like fruit red or yellowish, 15-20 mm. long, the stony coat of the drupelets alveolate, 4 mm. long.

leaflets

Priest Lake, Piper 3690

Known in our region only from ; the description is drawn partly from coastal specimens as to habit, corolla and fruit.

5.

R. idaeus L. var aculeatissimus Regel & Tiling. Raspberry. A low straggling shrub, often resting on herbage and windfall, the stems .5-2 m. long or more, light brown, armed with weak, straight prickles 2-3 mm. long; new growth reddish or whitish, glandular-strigose, the prickles soft to the touch; leaves pinnately 3-5-foliolate, often yellowish green, the blades 6-12 cm. long, broadly triangular in outline, lateral leaflets sessile, obliquely lanceolate-ovate, the terminal ovate, often obscurely 3-lobed, even 3-parted, all rounded, or rounded-cuneate at the base, acuminate, doubly serrate, the upper surface green, glabrate, plicate in younger leaves, lower surface minutely and densely canescent, becoming green, but paler than the upper surface; petioles 3-6 cm. long, glandular-strigose, the stipules filiform; axillary cymes, racemose; bracts subulate or foliar but reduced; peduncles glandular with stalked glands and pubescent, 1-2 cm. long in fruit; sepals ovate-lanceolate, 6-7 mm. long, acuminate, both surfaces pubescent and glandular with stalked glands; petals white, elliptical, subequal to the sepals or shorter; fruit a raspberry 8-10 mm. broad, bright red and juicy, the carpels 2.5-3 mm. long, covered with a minute red pubescence, readily separable, the receptacle bluntly conical, 3 mm. long, the hypanthium reflexed in fruit, the stones 2 mm. long, lightly alveolate.

somewhat

Common throughout our region, usually in open places, often on talus slopes or among rocks.

6.

R. leucodermis Dougl. Blackcap. An erect shrub, 1-2 m. tall, the branches drooping gracefully, very glaucous, armed with stout, usually curved prickles 2-4 cm. long, which are patently expanded at the base; new growth glaucous and thinly silky, soon glabrous, similarly armed; leaves pinnately 3-5 (rarely 7) foliolate, the blades 6-12 cm. long, broadly triangular in outline, the lateral leaflets stipitate, the stipes on vigorous shoots sometimes 1 cm. long, obliquely ovate, the terminal broadly ovate, frequently 3-lobed or parted, all rounded or lightly cordate at the base, acuminate, doubly serrate, the upper surface green, thinly silky, becoming glabrate, the lower surface densely albo-tomentose; petioles 3-6 cm. long, pubescent and armed, not glandular, the stipules filiform; terminal corymbs, the bracts subfoliar, much reduced, the peduncles armed, pubescent, 1-1.5 cm. long; sepals ovate-lanceolate, 6-7 mm. long, acuminate, both surfaces pubescent; petals white, elliptical, shorter than the sepals; fruit a black raspberry 8-12 mm. in diameter, the carpels 2-2.5 mm. long, covered with a minute pubescence, adherent but separating readily en masse, the receptacle bluntly conical, 3 mm. long, pubescent, the stones 2-2.2 mm. long, shallowly alveolate.

Throughout our region 2500-4500 feet, mostly in stream bottoms and moist but rather open woods. The fruit is of good flavor.

to each other

11. Dasiphora Raf. Shrubby Cinquefoil.

Shrubs with pinnate leaves and sheathing scarious stipules. Flowers axillary, showy. Calyx 5-parted, the tube saucer-shaped, the sepals alternating with sepal-like appendages. Petals 5, yellow, orbicular. Stamens numerous, inserted upon a disc in a single series, the filaments threadlike. Receptacle hemispheric. Styles clavate, attached near the middle of the ovary. Fruit a cluster of achenes.

1. D. fruticosa (L.) Rydb. [illegible] → A small much branched, leafy shrub 30-100 cm. tall, the bark cinnamon brown, flaking away; leaves mostly clustered on dwarf branchlets, softly hirsute, especially when young, more glabrate in age, the stipules thinly membranous, 3-6 mm. long, ovate lanceolate, conspicuous, connate often for half their length, the petioles .5-2 cm. long, the blades 1.5-2.5 cm. long, pinnately 5 (3-7) foliolate, the leaflets 1-2 cm. long, oblong to oblanceolate, sessile, commonly more or less revolute, the margins entire; flowers [illegible] on hirsute pedicels 1-1.5 cm. long; calyx lobes 8-9 mm. long, broadly triangular-lanceolate, acute, submembranous, the appendages linear, somewhat longer, green; petals bright yellow, [illegible] about 1 cm. long, narrowed to a short claw; stamens 3 mm. long, the filaments even; achenes numerous, about 1 mm. long, silky-pilose, [illegible]

Occasional on gravelly subalpine slopes, rarely as low as 3000 feet.

12. Sibbaldia L.

A low tufted mat-forming perennial herb with deep-seated rootstocks and ternate leaves. Stipules present. Flowers in a terminal cyme. Calyx 5-parted, the tube shallowly hemispherical, the sepals alternate with sepal-like appendages. Petals 5, yellow, obovate or oblanceolate. Stamens 5, inserted on the calyx tube, the filaments filiform. ~~Pistils few, the~~ styles attached laterally. Fruit a cluster of achenes.

1. S. procumbens L. ~~A low, mat-forming plant, the~~ stems caespitose, ~~slender~~ with ~~the~~ persistent brown leaf bases; leaves tufted, the petioles 1-3 cm. long, hirsute, the blades trifoliolate, the leaflets obovate-cuneiform, .5-1.5 cm. long, both margins lightly convex, entire, the apex truncate with usually 3 short teeth, both surfaces silky hirsute ~~but~~ green; flowering stems erect, 2-10 cm. long, hirsute, the bracts leaflike; ~~flowers several in a loose terminal cyme, on~~ pedicels 3-4 mm. long; calyx campanulate, the lobes ovate-oblong, acute, 2 mm. long, the appendages oblong, shorter; petals obovate, about equal to the appendages or shorter, yellow; stamens 5, shorter than the petals; pistils ~~several~~ glabrous, the style subequal to the ovary; achenes shining, subglobose, 1.2 mm. in diameter, elevated on slender pilose stipes about as long, surrounded by the somewhat enlarged persistent calyx, the lobes of which are 3 mm. in fruit.

Occasional in moist spots at the tops of high peaks.

not → Summit of Mt. S. of Fish Lake, 7000 ft., Epling and Houck 9559; Snowy Top Mt., 7000 ft., Warren 278; Roman Nose, 7000 ft., Epling.

, somewhat blue

13. Horkelia Cham.& Schlecht.

Perennial herbs with short rootstocks and pinnately compound leaves. Flowers in cymose panicles. Calyx 5-parted, the tube campanulate to saucer-shaped, the sepals alternating with sepal-like appendages. Petals white or cream-color, mostly obovate or oblanceolate. Stamens 10, inserted on the throat of the calyx-tube, the filaments dilated, subulate, persisten Receptacle conic or hemispheric. Styles slender, attached at the apex of the ovary, deciduous. Fruit a cluster of achenes.

fusca subsp. 1. H. capitata (Lindl.) Keck- An odorous herb with short stout rootstock; basal leaves several, 30 cm. long, the petiole equal to the blade, glandula leaflets commonly 7 pairs, the lower 2-2.5 cm. long, oval or orbicular, rounded-truncate at the base, sharply toothed and incised, the uppermost co fluent, wedge-shaped, all subglabrous or the upper surface sparingly hirsut ~~stem similar but smaller, the leaflets more wedge-shaped;~~ flowers in a dens hemispherical cluster, 3-4 cm. in diameter, the bracts foliar, the bractlet subequal to the calyces; calyx-lobes about 6 mm. long, narrowly lanceolate, triangular-lanceolate, very acute, hirsute, purplish, the appendages subula the tube hemispherical, half as long; petals wedge-shaped, about 7 mm. long, white; stamens 10, inserted in the throat of the calyx, the filaments trian lar-subulate, 2 mm. long; pistils numerous, the styles about thrice the leng of the ovary.

Forks of St. Maries R., 3250 ft., Leiberg 1120.

14. Ivesia T. & G.

Perennial tufted herbs with short rootstocks and pinnately compound leaves. Flowers few in terminal cymes. Calyx 5-parted, the tube campanulate to saucer-shaped, the sepals alternating with sepal-like appendages. Petals mostly obovate or oblanceolate, white or yellow. Stamens 5, inserted in the throat of the calyx-tube, the filaments not dilated. Receptacle hemispheric to flat. Styles slender, attached at the apex of the ovary.

1. I. Tweedyi Rydb. ——→ A compact [redacted] herb with a thick woody root, the stems very short, covered with old leaf bases; leaves chiefly basal, 8-10 cm. long, oblong-linear in outline, about 1 cm. broad, glabrous or sparingly hirsute, the leaflets about 15 pairs, 3-5 lobed, the lobes again often lobed, the ultimate segments oblanceolate-linear, blunt; flowering branches numerous, 10-15 cm. tall, somewhat glandular, bearing 1-2 reduced leaves; ~~flowers several in a terminal cluster, the~~ bracts lobed similar to the leaflets; calyx campanulate, 5 mm. long, the lobes triangular-lanceolate, acute, 3 mm. long, hirsute, the appendages half as long; petals yellowish, obovate, somewhat exceeding the sepals; stamens 5, inserted in the throat, the filaments even, somewhat longer than the anthers; pistils several, with long hairs at the base, the styles slender.

Divide between the St. Joe and Clearwater R., [redacted] 5850 ft., Leiberg 1198. Otherwise known only from the e. slope of the ~~Washington~~ Cascade Mountains of Washington.

15. Potentilla L.

Annual or perennial herbs with rootstocks. Leaves palmately compound, stipules present. Flowers mostly in open cymose panicles, few or many. Calyx 5-parted, the tube mostly hemispherical, the sepals alternating with sepal-like appendages. Petals 5, mostly yellow, rarely dark-purple, deciduous, obovate or obcordate. Stamens about 20 in 3 series, the filaments filiform or subulate. Style attached near the apex of the ovary, deciduous. Fruit a cluster of achenes.

0 Leaves palmately trifoliolate

2 Achenes distinctly wrinkled; petals 3 mm. long — 1. P. monspeliensis

2 Achenes smooth

4 Petals 1.5 mm. long or wanting; annuals; leaves 8 chiefly cauline — 2. P. rivalis

4 Petals 10-15 mm. long; perennial; leaves chiefly 8 basal — 3. P. flabellifolia

0 Leaves palmately 5-9 foliolate

2 Leaves thinly silky with soft fine hairs when 6 young, nearly or quite glabrous at maturity, and somewhat glaucous; petals 5-7 mm. long — 4. P. diversifolia

2 Leaves never glabrous or glaucous, in some 6 species white-tomentose beneath, or if green, hirsute with stiffish hairs

4 Leaves white-tomentose beneath with short 8 curled hairs, the veins hirsute, the upper surfaces green.

~~Leaves 5-foliolate;~~ Petals 2.5 mm. long — 5. P. argentea

~~Leaves 7-9-foliolate;~~ Petals 7-12 mm. long — 6. P. gracilis

4 Leaves green on both surfaces, more or less 8 hirsute with stiffish hairs; petals obcordate, 12-14 mm. broad — 7. P. Nuttallii

1. P. monspeliensis L. ——→ Perennial herb 40-60 cm. tall or more, erect, the stems branching only in the inflorescence, sparingly clothed with stiffish ascending hairs; leaves trifoliolate, the basal ones soon withering, smaller than the cauline, those on stiffish-hirsute petioles 5-10 cm. long, the stipules subfoliar, 1-1.5 cm. long, toothed like the leaves, joined only towards the base, leaflets mostly elliptical or oblong-elliptical, the terminal one larger, the laterals somewhat oblique, all singly and rather coarsely toothed, thinly hirsute on both surfaces; flowers numerous in terminal rather congested cymes, the bracts subfoliar, the branches and pedicels villous-hirsute, the latter .5-1.5 cm. long; calyx-lobes 3-4 mm. long in flower, ovate, acute, thinly hirsute, becoming 5-6 mm. long in fruit and chaffy, the appendages similar, more oblong, about half as large; petals pale yellow, obovate, truncate, 3 mm. long; stamens 1.5 mm. long; receptacle 3 mm. long in fruit, hispid; achenes .8 mm. long, wrinkled, straw-colored.

In meadows and low ground, usually below 3000 feet; infrequent.

2. P. rivalis Nuttall. ——→ An annual herb 30-40 cm. tall, branching, the branches ascending, softly hirsute, leafy; leaves trifoliolate, 1.5-3 cm. long, or the lowermost with an additional pair of leaflets, the petioles slender, hirsute, 2 cm. long toward the base of the plant, wanting in the upper parts; stipules foliaceous, ovate-lanceolate, 4-5 mm. long, mostly entire; leaflets oblanceolate-cuneiform, 1-2 cm. long, the margins serrate with about 7-9 teeth above the middle, both surfaces ashy-green, thinly and softly hirsute; flowers numerous, not showy, axillary even to the base of the plant, the pedicels slender, as much as 2 cm. long, hirsute; calyx-lobes ovate-lanceolate, 2.5-3 mm. long in flower, increasing to 4 mm. in fruit, thinly hirsute, the appendages similar, somewhat smaller; petals 1.5 mm. long, spatulate, light yellow, often apparently wanting; stamens 2 mm. long, receptacle conical at maturity, hirtellous; achenes glabrous; straw-colored, obovate, .6-.7 mm. long, not wrinkled.

Marshy ground at low elevations; Port Hill, Epling 10479; Granite Station, Epling.

3. P. flabellifolia Hook. ——→ A perennial herb with a stout scaly rootstock; leaves chiefly basal, the blades trifoliolate, the middle leaflet obovate, the lateral leaflets obliquely oval, all more or less dentate, the teeth mostly acute, both surfaces glabrous, the petioles 5-10 cm. long; flowering stems 15-25 cm. tall, commonly with 1-2 reduced but similar leaves, the bracts subfoliar; flowers 2-3 in a loose cluster, the sepals ovate-lanceolate, 8 mm. long, acute, the appendages nearly as long but triangular-lanceolate, very acute, both sparingly silky-hirsute; petals yellow, broadly obovate, notched, about twice the length of the sepals; stamens 5 mm. long, the filaments slender; achenes numerous, the style slender, more than twice as long as the achene.

Divide between the St. Joe and Clearwater R., 5200 ft. [illegible], Leiberg 1251.

4.

diversifolia

P. [redacted] var. glaucophylla [redacted] Lehm.

→ A perennial herb 10-20 cm. tall, the leaves palmately 5-foliolate, basal, arising from a rootstock 3-4 mm. in diameter, clothed with persistent brown leaf bases at the apex; petioles 3-8 cm. long, at first silky hirsute, becoming glabrous, the stipules scarious, brown, acute, adnate half their length or more; leaflets oblanceolate-cuneiform, 2-4 cm. long, 7-9 toothed mostly above the middle, now glabrous on the upper surface, now thinly silky, the lower surface silky hirsute, both commonly glabrous in age, and rather glaucous; flowers several in a cyme, [redacted] 15-20 cm. tall, at first silky, then glabrous and glaucous, bearing one or two reduced sessile leaves; ~~bracteoles stipuliform,~~ pedicels 2-3 cm. long in fruit, silky; calyx-lobes ovate-lanceolate, 3-4 mm. long in flower, silky, 5-6 mm. long in fruit, the appendages about half as large; petals obovate, yellow, 5-7 mm. long; stamens 2.5 mm. long; receptacle villous, 2.5 mm. long in age; achenes glabrous 1.5 mm. long, smooth. (P. glaucophylla [redacted])

the peduncle

Lehm.

Among rocks on high peaks. →

8435 ft.

→ Summit of Stevens Peak, [redacted], Leiberg 1475; Snowy Top Mt., 7400 ft., Epling 5915, 7245; Continental Mt, Christ 1671.

5.

P. argentea L. → A perennial herb about 30 cm. tall; stems numerous, ascending from a rather woody crown which is clothed with old leaf bases, thinly woolly with a short tangled pubescence, not at all silky or spreading; basal leaves on slender petioles 3-5 cm. long, clothed like the stems, the blades palmately 5-foliolate, 2-2.5 cm. in diameter, subrotund in outline, the leaflets oblanceolate, 1-1.5 cm. long, toothed above the middle with about seven salient teeth, the upper surface dull green, clothed with soft short closely pressed hairs, the lower surface white-woolly with close dense hairs, ~~the cauline leaves similar, smaller, or shorter petioles, the stipules herbaceous, lanceolate, formed only at the base, clothed like the leaves, the leaflets wedge-shaped with 3 to 5 teeth~~; flowers numerous in terminal cymes, the bracts subfoliar but smaller, the pedicels slender, 1-1.5 cm. long, clothed like the stem, not at all glandular; calyx lobes 1.5 mm. long in flower, 3 mm. long in fruit, ovate, acute, the appendages 1.5 mm. long, both with woolly and short soft hairs; petals bright yellow, 2.5 mm. long, obovate, stamens 1 mm. long; receptacle subglobose at maturity, 1.5 mm. long, woolly; achenes tan color, lightly wrinkled along the veins, .7-.8 mm. long.

Naturalized from Europe

[redacted] along a dry gravelly highway between Wallace and Kellogg, Epling and Houck 10113.

6.

P. gracilis Dougl. ——→A perennial herb with sometimes several divergently stems, ascending from a stout, branching caudex, covered with old leaf-bases, 30-60 cm. tall, branching only in the inflorescence, silky-hirsute with fine hairs, the hairs pointing upwards and more or less pressed to the stem; leaves mostly in a tuft at the base, palmately 5-9-foliolate, the petioles slender, 5-15 cm. long or more, clothed like the stems, stipules joined about half their length, the free tips green and herbaceous, linear or linear-lanceolate, clothed like the leaves, blades rotund in outline, 5-12 cm. or more in diameter the leaflets oblanceolate in outline or narrowly oval, 3-8 cm. or more long, cut on each side nearly to the midrib, less commonly only halfway into 5-6 similar linear spreading lobes 1-3 mm. wide, acute, upper surface green, thinly covered with soft silky hairs, the lower surface white-woolly, the veins bearing also soft silky hairs [illegible]; inflorescence open and graceful at maturity, the bracts herbaceous, commonly 3-lobed, the pedicels hirsute, not glandular; calyx-lobes lanceolate, 5-7 mm. long in flower, 7-8 mm. long in fruit, the appendages less than half as large, both silky; corolla saucer-shaped, the petals bright yellow, darker at the base, overlapping, conspicuous, obovate-orbicular, notched, 7-12 mm. in diameter; stamens 3 mm. long, 20 in 3 unequal series, the anthers 1 mm. long; receptacle 2 mm. long at maturity, woolly; achenes 1.2 mm. long, smooth, the veins hardly apparent.

Throughout our range, along roadways and in sunny open places, even in subalpine situations; highly variable, meadows and
best readily recognized.

7.

P. Nuttallii Lehm. ——→A perennial herb 30-60 cm. tall, or more, the rootstock woody, 5-8 mm. in diameter, often branching, clothed with old leaf bases, stems ascending, nearly glabrous or sparsely clothed with stiffish spreading hairs, not at all silky or woolly, branching only in the inflorescence; basal leaves in a tuft, the petioles twice the length of the blades or more, as long as 30 cm. in robust specimens, clothed like the stems, blades 5-10 cm. in diameter, subrotund in outline, palmately 5-7-foliolate, the leaflets oblanceolate, the margins coarsely toothed, but rarely halfway to the midrib, the teeth salient, acute, the inner margin of the tooth usually concave or sometimes straight, the outer margin convex, both surfaces green, sparingly clothed with short stiffish hairs; [illegible] flowers numerous in an open graceful cyme, the bracts mostly entire, the upper minute, the branches and pedicels slender, sparsely woolly and sometimes glandular; calyx lobes ovate to lanceolate, acute, or acuminate, 3 mm. long in flower, 5 mm. long in fruit, the appendages linear, 3 mm. long, scarcely 1mm. wide, both thinly hirsute; petals bright yellow, 6-7 mm. long, subrotund, notched; stamens 2 mm. long; receptacle 2 mm. long at maturity, thinly hirsute; achenes 1 mm. long, smooth.

In openings in the woods and meadows and along roadways at lower elevations; not seen in the north. Orogrande Cr.; Pierce; Clarkia;

16. Drymocallis Fourr.

Erect perennial herbs with rootstocks and pinnately compound leaves. Stipules present. Flowers in open corymbose cymes. Calyx 5-parted, the tube mostly hemispherical, bearing small sepal-like appendages which alternate with the sepals. Petals 5, rotund, whitish, cream-color or yellow. Stamens 20-30, arranged in a single series upon a glandular pentagonal disc, the filaments linear. Styles spindle-shaped, narrowed and acute at both ends, attached near the base of the ovary, deciduous in fruit. Fruit a cluster of achenes.

O Petals white or cream-color; branches of the inflorescence nearly erect, tending to form a narrow corymb; plants viscid — 4 — 1. D. convallaria

O Petals yellow, sometimes pale but clearly yellow; branches of the inflorescence ascending, usually gracefully, forming an open cyme; plants more or less glandular but not viscid — 4

2 Petals often pale, 4-6 mm. in diameter — 2. D. oregana

2 Petals usually bright yellow, 7-10 mm. in diameter

4 Plants not markedly pubescent, infrequently more than 40 cm. tall, the leaflets tending to rhombic, rather thickish — 8 — 3. D. fissa

4 Plants softly hirsute, the leaves not at all glandular, stems commonly 60 cm. tall or more, infrequently as low as 40 cm., the leaflets thin and soft, ovate, rounded at the base — 8 — 4. D. valida

1. D. convallaria Rydb. herb commonly 60-100 cm. tall with an often branching rootstock 5-6 mm. in diameter or more, clothed with persistent leaf-bases; stem erect, viscid-glandular throughout with spreading hairs; basal leaves 15-25 cm. long, pinnately 7-9-foliolate, oblanceolate in outline, the petiole subequal to the blades or longer, the terminal leaflet largest, obovate-rhomboidal even suborbicular, coarsely toothed and incised, especially above the middle, the lateral leaflets gradually smaller, obliquely ovate or subrotund, all thinly clothed with glandular hairs on both surfaces, the lower surfaces paler, the cauline leaves sharply once-toothed, 5-foliolate, the upper 3-foliolate and sessile, the stipules all membranous, green, more or less toothed, joined mostly toward the base; flowers rather numerous, the inflorescence tending to be corymbose with erect branches, forming often a rather crowded cluster, the bracts subfoliar, the pedicels viscid, 2-3 mm. long; calyx-lobes 7-8 mm. long, 8-10 mm. in fruit, the appendages 3-6 mm. long; petals nearly white, obovate-orbicular, 7-8 mm. long, hardly notched; stamens 2 mm. long; receptacle narrowly ovate, hispid; achenes glabrous, at first smooth.

Frequent at lower elevations on dry hillsides.

2. D. oregana (Nutt.) Rydb. [redacted] herb 30-40 cm. tall, with an often branching rootstock 5-6 mm. in diameter or more, clothed with the persistent leaf bases; stem erect, sometimes two from the same crown, glandular and thinly villous with fine hairs throughout; basal leaves 5-15 cm. long, pinnately 7-foliolate, oblanceolate in outline, the petiole [redacted] subequal to the blade, the terminal leaflet largest, obovate-rhomboidal, 1-3 cm. long, cuneate and entire below the middle, coarsely toothed above the middle, the lateral leaflets [redacted] obliquely ovate, similarly toothed, all rather pale green, thinly clothed with straight hairs on both surfaces, [redacted] the stipules of all membranous, green entire, joined most of their length; flowers few in a terminal graceful cyme with ascending branches, the bracts subfoliar, the pedicels glandular-villous 2-3 mm. long; calyx-lobes oblong, 4-6 mm. long, rather obtuse, glandular-hirsute, becoming as much as 8-9 mm. long in fruit and then chaffy, the appendages similar, about one third as large; petals pale yellow 4-6 mm. in diameter, obovate; stamens 2-2.5 mm. long; receptacle ovate, hispid; achenes glabrous, 1 mm. long, at first smooth, then finely wrinkled along the veins.

Common throughout our region in meadows and open places usually below 3000 feet.

3. D. fissa Rydb. [redacted] herb 30-40 cm. tall with well developed branching rootstocks; stems and petioles sparingly glandular-pubescent; basal leaves 10-15 cm. long, oblanceolate in outline, the leaflets commonly 7, the terminal leaflet rhombic-obovate, 2-3 cm. long, cuneate and entire below the middle, the lateral leaflets similar, the lowermost smaller, the petiole somewhat shorter than the blade, all irregularly doubly serrate, sparingly glandular, stem leaves similar, the uppermost sessile, trifoliolate, their stipules ovate-lanceolate or ovate, 6-9 mm. long, usually toothed; flowering stems somewhat glandular-villous, slender and gracefully branched; flowers few on pedicels 1-3 cm. long; sepals ovate, mostly obtuse, 5-6 mm. long [redacted], nearly 10 mm. in fruit and more obtuse, the appendages oblong, 2.5-4 mm. long; petals bright yellow, 8-10 mm. in diameter, subrotund, exceeding the sepals; stamens 20-30; achenes pear-shaped, acute, 1-1.2 mm. long, smooth.

Ridges south from Wiessner's Peak, Leiberg 1388; Hope, Epling.

4. D. valida (Greene) Piper. → Erect [redacted] herbs 40-90 cm. tall, with stout rootstocks; stems and petioles spreading hirsute with somewhat glandular hairs but not viscid; basal leaves 20-30 cm. long, oblanceolate in outline, the blades about equal to the dilated and clasping petioles, the lowermost pairs of leaflets much reduced; terminal leaflets 4-6 cm. long, ovate or obovate, somewhat rhomboidal, narrowed below the middle, but usually toothed to the base, the lateral leaflets broadly ovate, rounded at the base but oblique, obtuse, subsessile, all doubly incised-serrate, both surfaces softly hirsute with non-glandular hairs; stem leaves [redacted] smaller, the upper triternate, sessile, stipules subfoliar .5-1 cm. long; flowers [redacted] in ample cymes with gracefully ascending branches which are somewhat glandular with short spreading hairs but not viscid; sepals ovate, abruptly and shortly acuminate, 5-6 mm. long [redacted], increasing to as much as 10-12 mm. in fruit, the appendages mostly oblong, 2-4 mm. long, somewhat longer and broader in fruit; petals bright yellow, 7-9 mm. in diameter, longer than the sepals; achenes 1.2-1.5 mm. long.

Common at lower elevations in the drainage of the N. Fork of the Clearwater River in burns and open woods, as well as on the plateau above the canyon of the Clearwater River in meadows.

17. Argentina Lam. Silver Weed.

Stoloniferous creeping herbs with pinnately compound leaves with numerous leaflets and sheathing stipules. Flowers axillary and pedunculate solitary. Calyx 5-parted, the tube very shallow, the sepals 5, alternate with sepal-like appendages. Petals yellow, orbicular. Stamens about 20 in 3 series, the filaments filiform. Receptacle hemispheric. Styles filiform, laterally attached to the ovary, subpersistent. Fruit a cluster of achenes.

1. A. Anserina (L.) Rydb. ——→A perennial creeping herb with slender brown glabrate stolons; leaves in tufts at the nodes, 10-20 cm. long, oblanceolate in outline, pinnately 11-13-foliolate, the largest leaflets at the apex, the smallest toward the base, with smaller, often entire intermediate ones, all sessile, the uppermost subdecurrent; stipules sheathing the stem, scarious, or those of the first leaves on the stolons bearing linear green lobes, leaflets 2-3 cm. long, now elliptical, now oblanceolate-cuneiform, the margins coarsely toothed with 11-13 teeth, the upper surface dull green, thinly silky, the lower silvery silky; flowers on slender, hirsute ~~pedicels~~ peduncles 5-6 cm. long; calyx lobes lanceolate, 3 mm. long in flower, the appendages oblong-linear, somewhat longer, both silky hirsute; petals bright yellow, broadly oval, 5-6 mm. long; stamens 2.5 mm. long; achenes smooth.

Occasional in meadows below 3000 feet. Pritchard; Sandpoint.

18. Comarum L. Marsh Cinquefoil.

Perennial herbs with elongate, creeping rootstocks, rooting in mud and water, the leaves odd-pinnate. Flowers few in a terminal cyme. Calyx 5-parted, the tube saucer-shaped, the sepals alternating with sepal-like appendages. Petals 5, purple. Stamens about 20, inserted near the base of the receptacle. Receptacle hemispheric, enlarging and becoming somewhat spongy in fruit. Styles slender, even, attached near the middle of the ovary. Fruit a cluster of achenes.

1. C. palustre L. ——→A perennial herb with branching reclining stems 1 m. long or more, forming mats, the upper part erect, glabrous and glaucous, the internodes longer than the leaves; leaves mostly towards the base, the petioles 3-6 cm. long, clasping, expanded towards the base into membranous stipules 2-3 cm. long, the blades subequal to the petioles, pinnately 5-7-foliolate, the lower pair of leaflets smaller and more remote, the leaflets oblong-elliptical, 3-6 cm. long, mostly obtuse at both ends, subsessile, glabrous on the upper surface, the lower thinly hirtellous, glaucous, the margin sharply serrate; ~~flowers several in a terminal cyme or occasionally with secondary cymes in the upper axils, the bracts subfoliar but reduced, the pedicels 1-3 cm. long, hirsute and glandular;~~ calyx purple and green, the lobes ovate-lanceolate, 10-12 mm. long, acuminate, enlarged in fruit and enclosing the achenes, the appendages half ~~the length~~ or less, both thinly hirtellous; petals oval or elliptical, 4-5 mm. long, shortly acuminate, a rich purple; stamens 3 mm. long, deep purple, arranged in 2 series, the receptacle hispid, lengthening to 5-6 mm. in fruit; ovaries glabrous, half the length of the purple style which is attached at their base, becoming subglobose in fruit, 1.2 mm. in diameter, the receptacle globose, 8-10 mm. in diameter, hairy. ——→(Potentilla palustris Scop.).

Occasional in marshy ground of river bottoms or wet meadows throughout our range.

19. Fragaria L. Strawberry.

Low perennial herbs with leaves in a basal tuft on scaly rootstocks, bearing slender rooting stolons. Leaves 3-foliolate. Flowers white, borne in few-flowered cymes. Calyx 5-parted, the tube almost flat, the sepals alternating with 5 sepal-like appendages. Petals 5, subrotund. Stamens about 20-40 in 2 or 3 series, seated at the base of the receptacle. Pistils numerous, borne on a subconic receptacle. Styles attached near the middle of the ovaries. Fruit a red, fleshy accessory fruit, formed principally from the enlarged juicy receptacle.

0 Leaflets pale greyish-green, the margins convex — 1. F. glauca

0 Leaflets bright green, the margins cuneate and 4 straight below the middle, not convex — 2. F. americana

1. F. glauca (Wats.) Rydb. ——→Rootstock scaly, the stolons slender, 30-40 cm. long, silky-hirsute; leaves several, the petioles silky-villous, commonly 10-20 cm. long, leaflets pale greyish green, appearing glaucous, the upper surface glabrous, appressed-silky on the lower surface, the blades of the lowermost oval, usually entire in the lower half, the margins convex, not wedge-shaped, the upper obovate, tapering gradually and often entire two thirds of its length, all rounded at the apex, even, somewhat truncate, 3-7 cm. long, commonly half as broad as long, the margins coarsely toothed at the apex, the teeth ovate, mucronate; flowers several on slender silky-villous peduncles about equal to the leaves, soon reflexed, sometimes bearing a unifoliate bract at the base of the cluster and smaller toothed bracts above; calyx-lobes 5-6 mm. long, ovate-lanceolate, appressed-silky, the appendages similar, usually about as long; petals white, plane, nearly orbicular, 5-9 mm. in diameter, commonly rotate; stamens 30-40 in 3 irregular rows, very unequal, the anthers 1.3 mm. long, styles 1 mm. long; fruit oval, 10-15 mm. long, the calyx-lobes spreading; achenes 1 mm. long.

Common throughout our range at lower elevations, growing in situations similar to those of F. americana and with that species, from which it may readily be distinguished in the field by the shape of the leaflets but especially by its pale glaucous foliage. Intermediate forms do not seem to occur in our region.

2.F. americana (Porter) Britt. ——→Rootstock scaly, the stolons slender, as much as 50-60 cm. long, thinly hirsute; leaves several, some persisting two years, petioles thinly silky-hirsute, [redacted] 5-10 cm. long, in very moist rich soil sometimes much longer, leaflets yellowish-green, thinly silky hirsute on the upper surface, rugose from the lightly impressed veins, hirsute beneath and paler, but both surfaces green, the lower leaflets obliquely wedge-shaped and entire in the lower third, the upper sometimes wedge-shaped in the lower half, all rhomboidal, varying in length from 2.5-7 cm. but the breadth always more than half the length, the margins coarsely toothed, the teeth ovate, mucronate; flowers several on hirsute slender peduncles about equal to the leaves, usually bearing a unifoliate bract at the base of the cluster and smaller lanceolate bractlets above; calyx lobes 4-6 mm. long, oblong-lanceolate or ovate, sometimes toothed, appressed-silky, the appendages usually similar but smaller, usually half as long, rarely longer; petals white, somewhat crinkled, nearly orbicular, 6-7 mm. in diameter, commonly not rotate but forming a shallowly cup-shaped flower; stamens about 20 in two rows, anthers .7 mm. long; styles .8 mm. long; fruit oval, 10-15 mm. long, generally sparingly pilose, the calyx-lobes spreading; achenes 1 mm. long. (F. bracteata Heller; F. Helleri Holz.).

Common throughout our range at lower elevations in open gravelly places in the forest and in burns or on slopes of low hills toward the grass-land or in meadows.

20. Geum L. Water Avens.

Perennial herbs with rather stout rootstocks, ~~and~~ mostly basal pinnate leaves, the terminal lobe of which is much larger than the lateral lobes, and conspicuous stipules. Flowers few in terminal corymbs. Calyx 5-parted, the tube shallowly campanulate; sepals alternating with 5 sepal-like appendages. Petals 5, yellow. Stamens numerous, seated on the glandular ~~margin~~ rim of the calyx-tube. Pistils numerous, the styles not plumose, sharply twisted near the middle, the portion above the twist deciduous at maturity leaving the style-proper hooked. Fruit a beaked achene, lightly hooked at the apex.

1. G. macrophyllum Willd. Herb harshly hispid throughout, the basal leaves 10-30 cm. long, the terminal leaflet subrotund, 5-10 cm. broad, cordate, shallowly three-lobed, the lobes rounded, the lateral leaflets very unequal in size, rarely 2 cm. long, oval or rotund; ~~the~~ flowering stem 30-90 cm. tall, branching only in the inflorescence, bearing several nearly sessile leaves; pedicels finely glandular-puberulent, elongating to several centimeters in fruit; sepals ovate-acuminate, pubescent, soon reflexed, the petals orbicular, 5-7 mm. in diameter; stamens 2 mm. long; fruit a globose cluster 2 cm. in diameter, the receptacle 4 mm. long, 1 mm. wide, the achenes 2 mm. long, thinly hispid and hirtellous, the styles 5-6 mm. long, reddish and glandular below the twist.

Common throughout our range in meadows and moist places along roadways, or along small streams.

21. Sieversia Willd. Whiskered Avens.

Low perennial herbs with ~~rather stout rootstocks and~~ basal pinnately divided leaves, usually with smaller segments alternating with the larger ones and rather conspicuous stipules. Flowers ~~showy~~ solitary or few in a corymb. Calyx 5-parted, the sepals alternating with sepal-like appendages, the calyx-tube shallowly campanulate. Petals 5, yellowish. Stamens numerous, seated on the ~~margin~~ rim of the calyx-tube. Pistils numerous, the styles plumose, elongate in fruit. Fruit a tailed achene.

1. S. ciliata (Pursh) G. Don. An ~~appressed-hairy~~ ashy-green plant with several leaves arising from a stout hairy rootstock covered with old leaf-bases, variable in size and aspect, 10-30 cm. long, oblanceolate in outline, 3-5 cm. broad, pinnately divided into numerous rhomboidal leaflets, 1.5-3 cm. long, the uppermost confluent, the lower distinct and sessile, smaller, all minutely glandular and sparsely hirsute, irregularly 3-lobed, the lobes again incised, the ultimate segments lanceolate, 3-6 mm. long, rather obtuse, the petiole about half as long as the blade; flowering stems 2-3, branching only in the inflorescence, 15-40 cm. tall, elongating to as much as 60 cm. long in fruit, finely woolly and glandular and sparingly hirsute, bearing a pair of reduced leaves near the middle; bracts subfoliar; flowers several ~~in a terminal cluster~~, the pedicels woolly and glandular, ~~elongating to several centimeters in fruit~~; calyx rosy, woolly and glandular, the lobes oblong-ovate, 8-9 mm. long, urceolate in flower, the appendages shorter or somewhat longer, sublinear, spreading; petals hardly exceeding the calyx-lobes, yellowish tinged with rose, obovate, narrowed at the base; stamens subequal to the calyx-lobes, the filaments filiform, pilose ~~ovaries numerous, silky; receptacle 2-3 mm. long~~; achenes 2.5 mm. long, the style 4.5 cm. long, recurved, rosy in color. →(Erythocoma cinerascens, dissecta Gre

Frequent on gravelly prairies and along roadways.

22. Sanguisorba L. Burnet.

Nearly glabrous or glabrous herbs with chiefly basal pinnate leaves, ~~and stout rootstocks~~. Flowers small, numerous, in dense cylindrical spikes on elongated peduncles, perfect or unisexual. Calyx 4-parted, the tube urn-shaped, contracted at the throat, the sepals petal-like, scarious-margined, deciduous. Petals none. Stamens 2 or 4. Pistil 1, the styles terminal. Fruit an achene, enclosed in the persistent calyx-tube.

0 Leaflets 1-2 cm. long, pinnately divided; spikes 1-3 cm. long 1. S. annua

0 Leaflets 2-5 cm. long, serrate; spikes 5-8 cm. long 2. S. sitchensis

1. S. annua Nutt. A leafy erect annual, 20-40 cm. tall, with a stout tap-root, the stem branching freely; leaves 4-12 cm. long, oblanceolate, the leaflets obovate-oblong, somewhat oblique, 1-2 cm. long, pinnately parted nearly to the midrib into 9-15 narrowly oblong segments, 4-10 mm. long, scarcely 1 mm. wide, obtuse, the midrib sparingly villous; spikes 1-3 cm. long, 7-8 mm. wide, on peduncles 2-8 cm. long; calyx-lobes 2-2.5 mm. long, broadly ovate; stamens 4; stigmas brushlike; achene brown, ovoid, 3 mm. long, 4-angled, minutely pitted on the faces. (Poterium annuum Nutt.)

A weedy plant appearing in open and waste places at low elevations, abundant locally but not very frequent. Thatuna Mills, 3000 ft.; Forks of St. Maries R., 3575 ft.